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PHARMACEUTICAL JOURNAL

AND

TRANSACTIONS.

VOLUME VII.

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THE PHARMACEUTICAL JOURNAL.

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THE PHARMACEUTICAL BILL.

Notwithstanding the numerous petitions presented to Parliament, and the strong expression of opinion in favour of a Bill for regulating the qualification of Chemists and Druggists, unavoidable circumstances have hitherto prevented its introduction. It has been apparent for some time past that, in consequence of the pressure of business on the hands of the Government and the position of the House in reference to the approaching dissolution, there was but little chance of a Pharmaceutical Bill, or indeed any Bill relating to the Medical Profession, being carried during the present Session.

Even the Medical Registration Bill, which has passed the first reading, and is in a forward state, has been withdrawn, and Mr. Wakley has given notice that, in the event of his being returned at the ensuing election, he will re-introduce his Bill immediately on the opening of Parliament.

Although there was but little prospect of carrying a Pharmaceutical Bill during the present session, the Council considered it a suitable time for directing public attention to the facts of the case, and the demonstration which has been made will not be without its due effect. The necessity for such a measure is now generally admitted, and some erroneous impressions previously existing on the subject are removed. At the opening of the new Parliament we may anticipate a favourable result from past exertions, and may refer to the petitions which have been presented to the House as evidence of the fact, that an Act to regulate the qualification of Chemists and Druggists is considered necessary by the leading members of the Medical Profession and the Pharmaceutical body, and also by a majority of the public at large, in every district in which the sense of the public has been taken. We feel persuaded that the cause of Pharmaceutical reform is progressing favourably, although not with that rapidity which some of our Members might desire.

Those who have expressed dissatisfaction because the Council

did not several years ago bring forward a Bill, could not have been aware of the difficulty of the undertaking, or the nature of the obstacles to be overcome. In reply to such animadversions we have always observed, that any precipitate attempt to bring in a Bill would be fruitless, and that it would be policy to wait until the system of education and examination instituted by our body had stood the test of experience, and furnished us with ample evidence in favour of the proposed reformation.

This time has arrived: and every year—we might say, every month—which passes over our heads, furnishes us with additional evidence of the necessity of taking the next step in advance, and demonstrates the public advantage which would be derived from an Act of Parliament sanctioning an efficient Pharmaceutical Education and Examination.

Without reverting to the facts detailed in our last Annual Report, we may notice the statement from Bristol, published in this number, from which it appears, that in the prospect of a Bill which will of necessity create a demand for education, a School of Pharmacy is about to be established. We are informed that similar projects are in contemplation in other places where medical schools exist, affording facilities for the adaptation of the requisite appliances to the instruction of Pharmaceutical Chemists. That the public would derive great benefit from this extension of knowledge among those who furnish medicines to the sick, cannot for a moment be doubted: that this object cannot be effectually carried out on the voluntary principle, has been proved by experiment, as several schools of Pharmacy have been instituted and organised, but have failed for want of pupils. Nothing but the sanction of an Act of Parliament can create a general demand for Pharmaceutical education, and without this demand schools cannot flourish. It is on this ground, that application has been made to the Government for assistance in the production of a legislative measure, the object of which is, to provide the public with qualified Pharmaceutical Chemists.

We must not be discouraged because our first appeal has not met with an immediate response. The Secretary of State has acknowledged the importance of the subject, and merely postponed it on account of unusual pressure of business.

MEDICINE AND PHARMACY IN SPAIN.*

MEDICINE.

At a time when medical reform is the order of the day, and when it is admitted on all sides that some change is absolutely required in this country, it is desirable to obtain and circulate information concerning the medical institutions of other European States. In Spain, in many respects the least known, although not the least interesting country in Europe, these institutions might be expected to stand upon an inferior footing to those of some other countries, and we are therefore agreeably surprised to learn, that in medical institutions at least, this country of romance is in advance of some of its neighbours.

The Spaniards appear to be in no hurry to complete their learned education, and in order to pass through the regular terms required at their universities, many years of study are necessary. In every branch of university study they possess very learned men, and their universities are generally well regulated and richly endowed. From a table given in *Buchner's Repertorium für die Pharmacie*, we see the dates of the foundation of twelve of these universities, and the number of students attending them in the year 1841.

	DATE.	NUMBER OF STUDENTS.		DATE.	NUMBER OF STUDENTS.
Salamanca	1222	500	Alcala	1499	370
Valladolid	1346	1300	Sevilla	1504	800
Huesca	1354	550	Granada	1531	810
Valencia	1410	1600	San Jago	1532	1100
Toledo	1474	260	Orihuela	1552	130
Saragossa	1474	1100	Oviedo	1580	450

Besides these, in later times several high schools and medical faculties have arisen, among which those of Madrid, Cadiz, and Barcelona are the most flourishing.

Orfila remarks, that within the last few years, improved laws regarding medical studies and practice have been introduced, the credit of which belongs especially to the director Don Antonio Gil de Zarate and the Doctors Sévanc and Rubio. In 1845 the number of medical faculties was, by a decree of September in that year, determined to be five, *viz.* in Madrid, Cadiz, Valencia, Barcelona, and St. Jago. Their arrangements were generally the same, but that of Madrid enjoyed the highest and most perfect organization. The building of the faculty at Madrid, styled the College Royal of San Carlos, is exceedingly beautiful, and surpasses everything of the kind in France, England, Germany, Holland, Scandinavia, and Italy. The expense of this building

* Abstracted from a Paper by Orfila, Dean of the Faculty of Medicine, of Paris.—(*Gazette Med. de Paris*, 1846, *Nos.* 45 *et* 46).

and its arrangements amounted alone to about 4,000,000 francs; it stands on an area about 340 feet square, and it contains not only the different offices and localities for business, lecture-rooms, library, and museum, but also the clinical department.

A regular course of medical studies occupies nine years, in case the candidate aims at taking the degree of doctor in medicine; but should he desire only the title of licentiate, with permission to practise, the course of studies may be diminished to seven years. These latter practitioners are about the same as the general practitioners in this country, and in Spain are styled *medicos-cirujanos*. Every medical student is expected, about the fifth year of his studies, to pass an examination as bachelor of medicine; after which, in two years, he may become a licentiate, and in four a doctor in medicine. From among the doctors of medicine are chosen the professors and assistant professors (*agrégés*) as well as the medical men appointed to the mineral springs, or to the hospitals and court. The order in which the studies at the universities are undertaken is—

First Year. — Natural philosophy, chemistry, general and medical, each three times a week. General and descriptive anatomy, daily one hour. Anatomical exercises and lectures, daily, three hours.

Second Year.—Medical physics, daily. Experimental and theoretical physiology, five times a week. General and descriptive anatomy. Anatomical exercises three hours every day.

Third Year.—General pathology, four times a week. Anatomical exercises the same as in the preceding year. Pathological anatomy, twice a week. Therapeutics, Materia Medica, and writing of prescriptions, five times weekly. General practice.

Fourth Year.—General pathology and pathological anatomy, general practice, surgical anatomy, application of bandages, surgical pathology, clinical surgery, surgical operations, and exercises, daily.

Fifth Year.—Pathology of internal diseases, every day. Clinical surgery, likewise. Midwifery, diseases of women and children, daily. Practical exercises as during the former year.

Sixth Year.—Medical and clinical surgery, daily. Midwifery, forensic medicine, and toxicology, every day.

Seventh Year. — Clinical medicine and midwifery, public hygiène (medical police), and forensic medicine.

Eighth Year.—Analytical Chemistry, three times a week, under the direction of Professor Pow, comprising the study of poisons, provisions, drink, mineral waters, air, blood, &c. Public health (*hygiène publique*) twice a week.

Ninth Year.—Chemical analysis, three times a week. History and literature of medicine, three times a week. Medical conferences or consultations, under the direction of the professors, continued during the last four years.

The academical year commences on the 2d of October, and closes on the 31st of May. The four months of June, July, August, and September, are, in a climate like that of Spain, unfit for close study ; the clinical exercises continue, nevertheless, under the direction of the assistant-professors (*agregés*) during these months.

It is customary in Spain for the professors in physics and medicine to deliver their lectures without the assistance of notes, and they generally possess a remarkable readiness of delivery combined with great depth of observation, for which they are peculiarly qualified by their long and severe academical course of study, assisted, doubtless, by the expressive language of the country. This shining qualification is awakened and exercised during their course of academical studies ; it being the custom of the clinical professors, after their visits to the hospital, to proceed to the lecture-rooms, there to *examine* the students in clinical observations, diagnosis, causes of disease, prognosis, and cure. Examinations take place at the close of each year, and six questions are put to each candidate. For the details of the examinations for the degree of doctor of medicine and licentiate, we refer to the interesting letters of M. Orfila.

The faculty of medicine in Madrid consists of a dean, eighteen professors in ordinary, and eight assistant-professors (*agrégés-professores extraordinarii*). Each of the latter receives a salary of 2000 francs per annum, but no participation in the emoluments of the professors. It is their duty to assist the professors in cases of necessity, to conduct the clinical exercises during the vacation, to officiate as librarians and secretary to the faculty. In rare cases, they are expected to take the place of the professors as examiners. The eighteen professors in ordinary are divided into three classes, the first of which, consisting of seven, are called *professores de entrada*. The second class consists of nine, *de ascènso*, and the third of two, *de termino*. All advancement is by *concours*, which equally regulates the rise of professors and assistant-professors. No exception is made. This severe regulation is censured by Orfila, and it certainly appears degrading to compel men of high literary and scientific standing, some of them far advanced in years, to undergo such a trial. That it is severe may be readily seen, when we consider that in Spain such competition takes place, not merely in the individual department of knowledge vacant, but in the whole system of medicine. The acquisition of all posts, even the most subordinate, is subject to the *concours*. The number of medical students at Madrid is very large. In the year 1842-43, 2,305 ; in 1843-44, 1,539 ; in 1844-45, 1,765 ; and in 1845-46, 1,845. The number of licentiates promoted is annually about 100. The number of doctors of medicine is considerably less, and subject to much variation. Orfila does not give their numerical proportion.

Prior to entering upon his medical studies, the student must have given proof of his proficiency in the classics, and in natural sciences, general chemistry, mineralogy, zoology, and botany, by passing his examinations as bachelor of arts and philosophy; and it may be here remarked, that in Spain the study of Latin and Greek begins at a very early period of life (as early as the sixth year), and the examination for the bachelorship is often passed at the age of fifteen.

The different medical fees at the Madrid faculty are thus given by Orfila: — Annual subscription, 50 francs; examinations annually, 5 francs, or both together 55 francs; amounting during seven years to a total of 385 francs. The bachelorship costs 100 francs, the licentiate 750 francs, and the course of medical studies for the licentiate is consequently 1,235 francs. The diploma of doctor of medicine is 750 francs. Other minor fees, during the eighth and ninth year, 60 francs. The acquirement of the diploma of M.D., amounts therefore in all to the sum of 2,045 francs,— about £82 paid in fees or medical charges for the examination. Notwithstanding the expense attending medical studies, the number of legally-qualified practitioners is so great, that, according to Orfila, the medical schools could, during the next fifteen years, remain closed without causing a want of medical men to be experienced in the country. By a decree of 1845, it was ordained that no class of medical practitioners should exist, besides licentiates and doctors in medicine; but the Queen has, in a recent ordonance of 1846, permitted the formation of an inferior class *Ministrantes de Chirurgia*, who are allowed to practise as subordinate to and under the superintendence of the first class.

PHARMACY.

There are in Spain two pharmaceutical faculties, one in Madrid the other in Barcelona; the title of Doctor in Pharmacy is, however, granted only in Madrid. For the faculty of Pharmacy, there is in Madrid a large and noble building, containing rooms for the different offices, lecture rooms, apartments for the meetings of the faculty, public *concours*, &c., as well as for the different mineralogical, zoological, chemical, and pharmacological collections. There are besides several laboratories, one of which, under the direction of Professor Camp, is especially intended for the use of the students of the pharmaceutical department during their course of studies. With regard to the botanical garden belonging to the faculty, Orfila observes, that it is not sufficiently ample, and the students of Pharmacy are consequently under the necessity of proceeding to the Royal Botanical Garden, which is however at once the pride and ornament of the metropolis.

The whole course of pharmaceutical studies occupies, like that

of medicine, nine years; that is, in case the candidate aspires to the rank of Doctor in Pharmacy. The majority of students are however satisfied with the degree of Licentiate of Pharmacy, to obtain which, only seven years study are necessary. This degree ranks with that of licentiate in Medicine, and entitles the possessor to practise Pharmacy throughout the whole kingdom; while the doctors of Pharmacy are, in addition to this, qualified for the public offices of instruction, such as *Agrégés* and Professors in Pharmacy. At the expiration of the fifth year, every student of Pharmacy is expected to pass an examination as *Baccalaureus pharmaciæ*, which title is merely honorary, and does not allow of his practising Pharmacy independently. In order to be enrolled among the students of Pharmacy a good education is indispensable, and candidates are required to pass the *examen philosophicum*, besides devoting at least one year to the study of general chemistry, mineralogy, zoology, and botany. After these preliminary examinations, the student commences at the College during

The First Year.—Special mineralogy and zoology, with reference to Pharmacy and description of pharmaceutical preparations, three times a week, under Professor Lallana.

Second Year.—Pharmaceutical botany and Materia Medica, with special description of the plants used in Pharmacy, three times a week, under Professor Leon.

Third Year.—Chemistry of inorganic substances and pharmaceutical chemistry, three times a week, with Professor Ximenes.

Fourth Year.—Chemistry of organic substances and chemical pharmacy, three times weekly, with Professor Rioz.

Fifth Year.—Practical instruction in all pharmaceutical operations, with Professor Camp.

Sixth and Seventh Years.—Pharmaceutical practice in a dispensing establishment.

Eighth Year.—Chemical analysis of alimentary substances, drinks, mineral waters, poisons, &c., with Professor Pow, who likewise directs the studies of the medical students in this particular branch.

Ninth Year.—Bibliography, history, and literature of medicine and pharmacy, by Professor Asuero of the faculty of medicine.

According to Orfila, the professors of pharmacy, like those of medicine, lecture without notes, and distinguish themselves by a profound knowledge of their profession. With regard to the course of pharmaceutical studies, he remarks that greater attention seems to be bestowed upon the theoretical than the practical education, and that the materia medica, practical pharmacy, and toxicology, appear somewhat neglected when compared with other branches. There is in this respect a striking contrast between the system of pharmaceutical education in Spain, and in this country. In Spain, too little attention is paid to practical phar-

macy, while in Great Britain, the theoretical education of pharmaceutists is (so far as the legislature is concerned) entirely neglected. The preliminary liberal education, strictly enforced in Spain before the student of pharmacy can be enrolled before the faculty, is, we think, highly creditable to the Spanish profession, and is, to a certain extent, worthy of imitation in this country. The entire course of study at the Spanish institutions (nine years) is prolonged to an unnecessary extent. Supposing the preliminary examination to be passed at the age of sixteen or seventeen, a course of pharmaceutical studies extending over four or five years, including the time occupied in the shop, would be, in our opinion, quite sufficient to enable the student to qualify himself for a good practical examination in pharmacy. Orfila seems to think that a period of eight years ought to be allowed for the qualification, and that the student should begin with the theoretical portion, and occupy the sixth and seventh years in the dispensary, to obtain a knowledge of the practical part of his profession. In Buchner's *Repertorium für die Pharmacie* quite a contrary view is taken, and the German system of commencing with the practical part is defended. The writer in the *Repertorium* thinks that the student of pharmacy, after five years studies at the university, will scarcely be induced to accommodate himself to the dry and often disagreeable duties of the shop. We consider that the two departments of the pharmaceutical education ought to be continued together. The neglect of either the theoretical or practical portion, must of necessity detract from the efficiency of the pharmaceutical Chemist.

All students should attend a regular course of lectures, as well as of practical chemistry in proper laboratories, at the same time keeping in view the necessity of unremitted attention to the ordinary duties of the profession from which they are to derive a subsistence.

At the expiration of each year the student in Madrid is examined by two professors and one *agrégé*, as to his progress during the year. At the licentiate examination at the end of the seventh year the candidate is examined *orally*, in *writing*, and also practically in *chemical analysis*. The examination is quite as severe as that for the corresponding degree of licentiate in medicine. The examination for the degree of Doctor in Pharmacy is passed by comparatively few persons, the ordeal being very severe, and the vacancies at the faculty occurring at rare intervals. The pharmaceutical faculty in Madrid consists of the above-mentioned six professors and three *agrégés*, or assistant-professors. Of the latter, one acts as secretary to the faculty, another as librarian, and the third as director to the laboratory. In 1842, the number of students of pharmacy registered by the faculty was 650, in 1843 it had increased to 780.

The fees are as follows :

Registration for first year	55	Francs.
Total for the five following years	275	"
Degree of Bachelor of Pharmacy	125	"
——— Licentiate	750	"
Total	1205	"
(Or rather more than £48 sterling.)		
The degree of Doctor of Pharmacy, *rarely taken*	750	"
	1955	"

(Or about £78 sterling.)

The above abstract of the papers on medicine and pharmacy in Spain, by Orfila, has reference to the state of these sciences subsequently to the reform of 1835. Prior to that period the medical institutions of the kingdom were submitted to a board of medicine, appointed by the minister or by the crown, and subject to all the inconveniences attending a close connection between science and power. The distinction between physicians and surgeons was rigidly observed, and government situations given to the most subservient. The physicians in Spain seemed inclined to be more liberal than their opponents the surgeons, and with few exceptions joined the constitutional party of 1820. Upon the overthrow of this party in 1823, King Ferdinand revenged himself upon the liberal physicians by a decree converting surgeons into physicians, surgical colleges into medico-chirurgical, and granting the title of *medico-cirujanos* to a great number of young surgeons and students. No physician was permitted to enjoy any medical post at court, or in any of the public establishments, hospitals, &c. This state of affairs lasted quietly until the death of this medical reformer, when a contest arose between the physicians and medical colleges or surgeons appointed by Ferdinand. At length, by a royal decree of Christina, a medical commission of five members was appointed to consider the state of medicine in the kingdom and to draw up a plan for the necessary reform. The result of their deliberations has been briefly given in this paper and may probably be interesting to the medical reformers of our own country.

Preamble to the Royal Decree, appointing a Commission of Five Persons with a Secretary, to consider and report upon the modifications necessary for the Medical Reform in Spain.

"Animated by pure zeal for the preservation of the Public Health, and convinced of the necessity of rendering uniform the studies which are the basis of the healing art in all the Colleges and Universities now existing, or which hereafter may be founded in the kingdom; persuaded also of the advantage of duly honouring those who dedicate themselves to a profession as noble as it is necessary; I have thought well to institute a Commission, which may examine and propose to me such changes as the laws now in force may be susceptible of, and of whatever else, in the opinion of the Commission may contribute to the lustre of the Profession and the welfare of the Public."—*Bulletin de Medecina, Cirugia, y Farmacia*, Madrid, 1835.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS,

ASSOCIATES, AND APPRENTICES (*continued*).

Elected in June.

MEMBERS.

Accrington	Crompton, Robert, Abbey Street
Audlem	Higginson, Henry, High Street
Bradford	Outhwaite, William Thomas, 27, Kirkgate
Frome	Harrold, Alfred H., Upper Market Place
Leeds	Brooke, John, Swan Street
London	Bevan, Charles F., 77, Hackney Road
	Travers, James, 367, Rotherhithe
	Uppleby, Henry, 27, Bishopsgate
Manchester	*Bufton, Edward, 89, Piccadilly
	Cooper, Matthew A., 183, Deansgate
Melrose	Walker, James
Mold	Williams, Thomas, Wrexham Street
Newcastle-on-Tyne	Walker, Edward, Grey Street
Tetbury	Walker, John, Long Street
Thorney Abbey	Dodman, Robert
York	Tonge, James S., Petregate

MAJOR EXAMINATIONS.

Ash, Samuel Ley	Plymouth
Dawe, Thomas	Swansea
Edwards, John Baker	Liverpool
Foster, Henry James	London
Knight, Thomas	Bath
Langdon, William	Bampton

MINOR EXAMINATION.

Down, John Langdon Haydon	Torpoint

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Ashton, William . . .	Mr. Garside . . .	Southport
Atkins, Samuel R. . .	Mr. Barling . . .	Weymouth
Backhouse, William . .	Mr. Rhodes . . .	Leeds
Blayney, Joseph J. . .	Mr. Boden . . .	Chester
Caley, Albert J. . . .	Mr. Knowles . .	Maidstone
Cattle, George . . .	Mr. Baker . . .	York
Hutton, Samuel . . .	Messrs. Higgs & Co.	Maidenhead
Johnson, Simeon F. R. .	Mr. Rhodes . . .	Leeds
Procter, James . . .	Mr. Daniel . . .	Runcorn
Sims, John F.	Mr. Haslam . . .	Southampton
Stokoe, John	Mr. Badcock . .	Barnard Castle
Wright, Edward . . .	Mr. Wilson . . .	Lancaster

ERRATUM, IN THE LAST NUMBER.

In page 581, line 8, *for* Fuller (Gosport), *read* Fidler

ORIGINAL AND EXTRACTED ARTICLES.

ON THE ESSENTIAL OIL OF BITTER ALMONDS.

BY MR. R. D. GRINDLEY.

There is a great discrepancy in the opinions that have been expressed by Chemists and Toxicologists, as to whether the pure oil of bitter almonds, or hydruret of benzoyle, be poisonous or not. By some the known poisonous properties of the crude oil of bitter almonds of commerce is ascribed entirely to the hydrocyanic acid which it contains, while others assert that the oil freed from prussic acid is still a violent poison. The experiments which are mentioned by Dr. Christison and Dr. Pereira would appear to have settled the question, and to have left no further doubt, that pure oil of bitter almonds possesses no poisonous properties; but the assertion of the opposite opinion in the *Outlines of Chemistry*, more recently published, by Dr. Gregory, has again created doubts on the subject.

As public attention has been of late so much directed to this substance, I felt desirous of making some experiments on it, and my results are as follows :—

At first I adopted the usual plan for removing the hydrocyanic acid, by distilling the commercial oil with a mixture of protochloride of iron and lime; the product was still contaminated with the acid, and several repetitions, conducted with every precaution, were attended with no better success; I then adopted, by the suggestion of Mr. Redwood, the following method, which proved most satisfactory. The oil was mixed with an equal quantity of water, and digested in a water-bath with binoxide of mercury, and small quantities of lime and protochloride of iron ;

time having been allowed for the decomposition of the acid, the whole was introduced into a copper retort,* and subjected to distillation; the product consisted of pure hydruret of benzoyle, while bicyanide of mercury, benzoate of lime, chloride of calcium, and oxide of iron, remained in the retort, with benzoine and any excess of the ingredients employed.

The process is founded upon the strong affinity which exists between mercury and cyanogen, so that when binoxide of mercury and hydrocyanic acid are digested together, they are both decomposed, bicyanide of mercury and water being formed. The protochloride of iron, which with the lime yields protoxide, is introduced to prevent the formation of benzoic acid, from the oxidation of the oil; for the same reason, care should be taken to conduct the process with as little access of air as possible. The oil thus procured was pure and colourless. No trace of nitrogen could be detected by Lassaigne's test, which I found to be exceedingly delicate, affording indications of the presence of that body in extremely minute quantities of morphia, narcotine, &c.; it consists in adding to a very small quantity of the substance to be tested, in a small German glass tube, a fragment of potassium, about the size of a millet-seed, and heating the tube in the flame of a spirit-lamp, until the organic substance is completely carbonized, the carbonaceous residue is treated with cold water, and to the clear decanted liquor a drop of a solution containing the mixed oxides of iron is added; a dirty green precipitate is immediately formed, which, if nitrogen be present, is changed into a bright blue, on the addition of a drop of hydrochloric acid.

Five drops of this pure oil were administered to a rabbit, and no effect being produced, ten more, dissolved in olive-oil, were given to the same animal the following day, still without any injurious results, except slight irritation, attributable to the acridity of the oil; thus giving satisfactory evidence of the fact that essential oil of bitter almonds when *pure*, does not possess poisonous properties.

The extreme difficulty of freeing the oil from the hydrocyanic acid by the usual process, seems to account for the contradictory results of former experiments; and when we reflect on the numerous fatal consequences attending the use of this article for domestic purposes, and the simplicity and economy of the above process, it becomes important, that manufacturers of this article should give their attention to the subject, and endeavour to supply the public with a preparation at once perfectly harmless, and still possessing the agreeable flavour for which it is so highly esteemed.

Laboratory of the Pharmaceutical Society,
17, Bloomsbury Square.

* It was found to be impossible properly to conduct the distillation in glass in consequence of the violent bumpings which took place in the mixture.

The following letter, relating to this subject, from the *Manchester Guardian* of June 19th, has been forwarded to us by a correspondent:—

CAUTION TO DRUGGISTS AND HOUSEKEEPERS.

TO THE EDITOR OF THE MANCHESTER GUARDIAN.

SIR,—I think it my duty to give publicity to the following case, not with a view to censure any one, but to caution Druggists and housekeepers against the practice of vending and employing for culinary purposes the essence of bitter almonds, without due *printed* instructions as to the quantity to be used, and the danger of deviating from the instructions given:

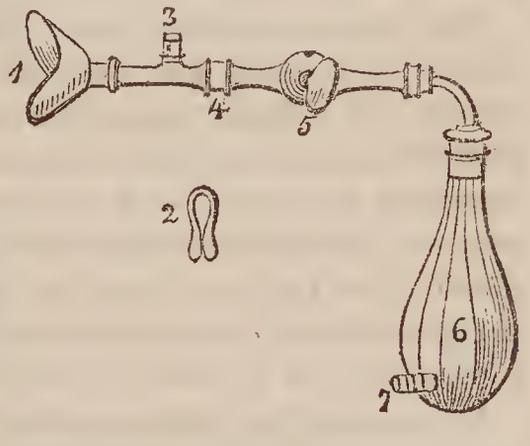
I was called professionally to a lady labouring under symptoms which induced me to inquire into the diet taken on the previous day, when a statement was given, proving that some custard of which she had partaken had acted poisonously (though, happily, not fatally) her symptoms having been such as are familiar to medical men as the effect of an over-dose of prussic acid. Bitter almonds in substance, and in the form of essence, likewise the kernels of stone fruit, contain this acid in different proportions, which fact should be known, as it is much to be feared that these articles are used ignorantly with respect to their dangerous properties. In mentioning the case of my patient to a medical man, he informed me that a friend of his had had placed before him some custards, which seemed to be superimpregnated with bitter almonds. On questioning the cook as to what she had used, she replied, "Nothing but almond water, which is a harmless thing; I'd drink a bottle full of it!" "Would you?" replied the gentleman, "then bring me the liquid and the cat;" when on pouring a small quantity of the liquid into the animal's mouth, poor puss instantly expired. The object of this notice, then, is to caution Druggists especially against selling bitter almonds, or the preparation entitled *essence* of the same, without full and explicit *printed* directions as to the quantity which may be safely used (if the pampered palate require that they should be used at all) as adjuncts to custards, puddings, and such like articles of diet.

CHIRURGICUS.

PORTABLE ETHER INHALER

OF MR. WILLIAM HOOPER (7, PALL MALL EAST).

1. Contour for the mouth.
2. Nasal spring.
3. Horizontal valve.
4. Vertical flap valve.
5. Two-wayed stop-cock.
6. Vulcanized India Rubber Bottle.
7. A capped tube.

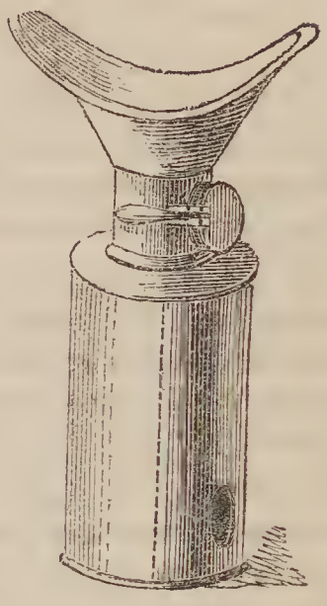


The ether is supplied by being poured into the vulcanized India rubber bottle, through the tube No. 7, *the cap of which should be removed during inhalation.*

[Mr. Hooper has contrived an inhaler for horses, of which we intend to give a cut next month.]

FOUR-CELLED PORTABLE ETHER INHALER

OF MR. T. HERBERT BARKER (BEDFORD).



The instrument consists of two cylinders fitted one within the other. The inner cylinder is divided into four cells, the partitions being so arranged as to secure the passage of the air through the sponge in each chamber. The *expiratory* valve is a flute-key-valve, and can be kept open by depressing the handle during a protracted operation, so that pure air may be respired without removing the apparatus from the mouth; by this simple contrivance, all danger of asphyxia is removed. The mouth-piece is well adapted to the shape of the mouth, and is *electro-plated.* The entire apparatus is extremely portable, being only four-and-a-half by two inches, and fitted in a small morocco case with ether bottle.

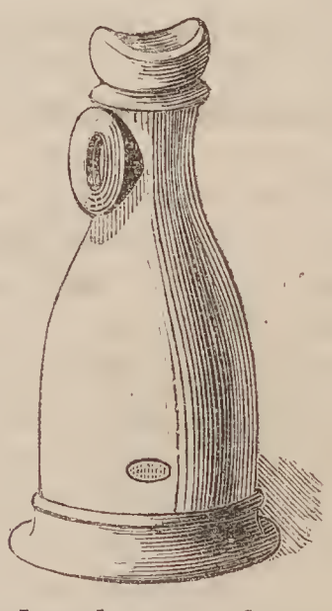
There is as small a waste of ether as possible in the use of this instrument.

(*Made by Mr. W. W. Kilpin, Bedford*).

ETHER INHALER

OF DR. HEDLEY (BEDFORD).

Described in our last Number, page 587.

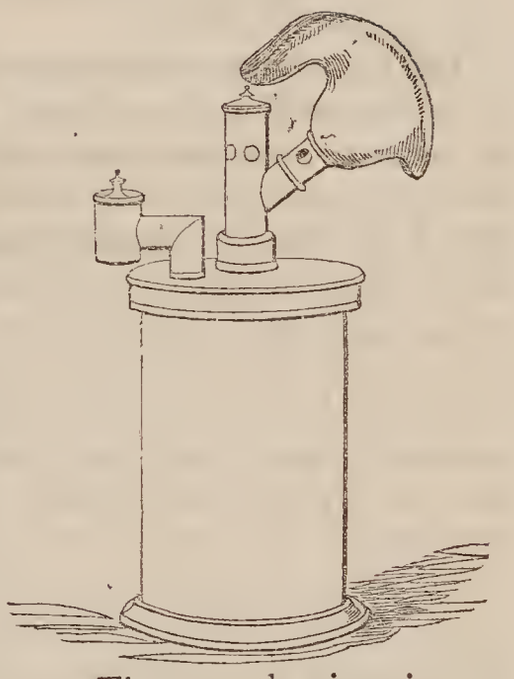


Made chiefly in box-wood, mahogany, cherry-tree, and lignum-vitæ.

(*Made by Mr. Howard, Barbican.*).

PORTABLE ETHER INHALER

OF MR. SQUIRE (277, OXFORD STREET).



The chief merit of this form of portable ether inhaler lies in the arrangement and the surface, which absorbs two fluid ounces of ether; and in order to get the largest surface in a given space, the form of the Archimedian screw is adopted. The valves are spherical, and arranged in the same way as in Mr. Squire's large glass apparatus, including the means of regulating the power, as already described in vol. vi., page 350. The air entering at the arm on the left of the figure, passes in a continuous stream through the screw without impediment. The mouth-piece is constructed and arranged so as to close the nostrils during inhalation.

ON GUM ANIME.

BY MR. ORLANDO CREASE.

Your correspondent, Mr. Hamilton, has stated, as reported in your journal for May, that this is the product of the locust-tree (*Hymenæa courbaril*). I think there must be some mistake in this. The gum *anime* of commerce, so called, is a hard resin, not soluble in spirit of wine, as reported by Nicholson, Ure, Brande, and others, at least according to my experience. It comes to us mostly from Bombay, and, I have been informed, is obtained chiefly, if not wholly, from Zanzebar. I have been told that it is dug from the sands, and that an idea exists that it grows in the earth. In breaking the gum, we often find insects like gnats and emmets. It has been said that there are no insects now in existence analogous to them, and that the tree from which the resin exuded is extinct, and therefore the substance of the resin is the remains of some forest destroyed by fire, and the site overwhelmed by the sands. I do not vouch for these particulars—I think there may be some truth in them, because a resin lately introduced from New Zealand, called Kaurïe gum, is, I have been informed, found in considerable quantity in parts where the tree no longer exists, imbedded in the earth, while in other parts the tree is found and the resin

also. It is not improbable that the amber, mostly found after storms on the shores of the Baltic, the origin of which has been and is involved in obscurity, may be accounted for in somewhat the same manner.

On the whole there exists much obscurity and uncertainty as to the various resins in use by the varnish-maker. We have, for instance, several known by the name of *copal*, by which the *anime* of commerce was formerly known at the Custom-house, none of which are readily soluble in spirit of wine, and materially differ in their properties,

Cow Cross Street, 17th June, 1847.

[There is certainly much confusion in the accounts given by authors of the sources of the resins known in commerce by the names of *anime* and *copal*. These resins are partly brought from India and partly from South America. The name *copal* is said to be of Mexican derivation, while *anime* is an Indian name; nevertheless, the resin brought from America is frequently called *anime* in commerce, especially on the continent, while that brought from India is called *copal*. Both kinds of resin have many characters in common, and they are supposed to be produced by trees of the same genus but different species. The *Hymenæa courbaril* yields the American resin, and *Hymenæa verrucosa* is supposed to yield that which is imported from the east.—Ed. Phil. J.]

ON THE KORARIMA.

We have received a *reclamation* from Mr. Charles Johnston, author of *Travels in Southern Abyssinia*, on the subject of the scitamineous fruit called *Korarima*, noticed in our number for May last, by Dr. Beke.

Mr. Johnston denies that Dr. Beke gave him, whilst travelling in the Red Sea, specimens of the Korarima, and adds that he has supplied the collections of several gentlemen with specimens since his return from Abyssinia, among whom he mentions, besides Dr. Pereira, Dr. Royle, Mr. J. South, of St. Thomas's Hospital, and the Rev. J. Yates. Mr. Johnston states that he brought from Shoa two large boxes of the productions of that country, and since his return has received letters from several public institutions, including the British Museum, thanking him for his contributions.

GREEN OXIDE OF CHROMIUM.

"*Worksop*, 15*th June*, 1847.

"Sir,—If the following improved method of preparing green oxide of chromium can be of any service in the pages of your interesting journal I shall feel obliged by your insertion of it.

"Ignite bichromate of potash, with a quarter of its weight of sublimed sulphur (flowers of sulphur), by throwing the ground mixture in small quantities into a red-hot crucible, stirring the pasty mass until all the excess of sulphur is burnt. Pour on to an iron plate and wash the green mass with water, until the precipitate is pulverulent, and the water becomes clear and tasteless, or until it gives no more precipitate with chloride of barium or acetate of lead. The powder obtained after drying in a water-bath, or at a gentle heat, is of a beautiful green colour, and may be employed either as a valuable and permanent pigment for oil or water medium, or to prepare the metal from.

"The process indicated by Dr. Ure in his *Dictionary of Arts and Manufactures*, in which a mixture of gunpowder, sal ammoniac, and bichromate of potash is recommended, does not yield so good a result owing to a portion of unconsumed charcoal, which renders the oxide of chromium darker than it ought to be.

"I believe sulphuret of potassium and sulphate of potash are the soluble salts produced in my process, which I have tried repeatedly with constant success.

"I have also tried the green ink recommended in your journal, and find it to answer very well; it is, in fact, nothing more than sulphate of chromium, mixed with sulphate of potash.

"I remain, Sir, your reader,

"F. Trachsel,

"*Lecturer on Chemistry.*"

[The above is one of the best processes for preparing oxide of chromium, although not new; it is mentioned in Graham's *Elements of Chemistry*.—Ed. Ph. J.]

ON CITRATE OF MAGNESIA,

AND A PURGATIVE WATER MADE WITH THIS SALT.

BY M. ROGE DELABARRE.

On making some experiments with the salts of magnesia, I had occasion to observe that the citrate of magnesia is devoid of the bitter and disagreeable taste which characterize the other soluble salts of this base.

This result, which at first surprised me, appeared less extraordinary on considering that of all the soluble salts of iron, the citrate is almost the only one which is free from the particular taste that distinguishes the ferruginous salts.

Experiments founded on these observations, led to the conclusion that these facts, so far from being exceptions, may be taken as illus-

trations of a law which may be thus generalized:—That, *of all the salts of any base, the citrate is that in which the taste peculiar to the base is to the greatest extent lost.*

Citric acid, which appears to have the property of thus modifying the taste produced by the base with which it may be combined, is obtained in several states. It contains sometimes three, sometimes four, and sometimes five atoms of water.

According to Liebig, the formula for citric acid, such as it is met with in combination with oxide of silver, is $C_{12}\ H_5\ O_{11} = \overline{Ci}$.

Crystallized citric acid, dried at 212°, contains $C_{12}\ H_5\ O_{11} + 3\ H\ O = \overline{Ci} + 3\ H\ O$.

If it be crystallized from a boiling solution, it will contain $C_{12}\ H_5\ O_{11} + 4\ H\ O$; and if crystallized by spontaneous evaporation at 68° Fahr., its composition will be $C_{12}\ H_5\ O_{11} + 3\ H\ O + 2\ H\ O = Ci + 5\ H\ O$.

Citric acid is a tribasic acid, it forms with bases neutral salts, acid salts, and basic salts.

In the neutral salts, each atom of acid is combined with three atoms of base. These salts are represented by the following formula: $\overline{Ci}, 3\ M\ O + Aq$. Their composition, is, therefore, analogous to that of the acid, with four atoms of water. The water of hydration in these salts may be replaced by an atom of metallic oxide, when basic salts are formed. These have an atom of water of crystallization, which they lose at common temperatures, as the salt of silver, or at a higher temperature. They are therefore analogous to the acid with five atoms of water. The composition of the basic salts when dried, is $\overline{Ci}, 3\ M\ O + M\ O$.

The citrate of magnesia, which forms the subject of this notice, is a salt but little known, being scarcely mentioned by Chemists. Liebig in his *Traité de Chimie Organique*, merely says, "Magnesia, alumina, and protoxide of manganese, form, with citric acid, neutral insoluble salts, and soluble salts which are acid."

Berzelius, in the eighth and ninth volumes of his *Traité de Chémie*, which treat of the salts of magnesia, mentions the oxalate, the acetate, and the tartrate, but not the citrate. In his theory of chemical proportions he gives the following composition for the citrate:—Magnesia, 26.12; citric acid, 73.88; but no account is here taken of the water of crystallization, which the salt contains.

Citrate of magnesia may be obtained in two different ways. It may be made by double decomposition from sulphate of magnesia and citrate of soda, or by saturating a solution of citric acid with magnesia or the basic carbonate. If it be prepared by saturating a solution, somewhat concentrated, of the acid, the liquor which is at first liquid and transparent, becomes in an instant a hard mass, adhering strongly to the sides of the vessel in which the combination is effected. This arises, probably, from the water which at first holds the salt in solution, passing to the state of water of hydration.

The neutral citrate of magnesia, prepared by either of the processes above described, is a white pulverulent insipid salt, soft to the touch, heavier than magnesia, and soluble in water aided by the addition of a slight excess of the acid. This solution has a slightly acid taste, but is in no way disagreeable.

A small quantity of the citrate of magnesia having been put into a

glass tube and heated over the flame of a lamp, aqueous vapour was disengaged and condensed at the other end of the tube. On further heating the tube, white inflammable vapours were given off, in which carbonic oxide and acetic acid were distinguished.

One gramme of citrate of magnesia, dried *in vacuo*, and then strongly calcined in a porcelain capsule, left a white residue, consisting of pure magnesia, and the weight of which was 0.170.

Citrate of magnesia may, therefore, be considered as having the following composition :—

1 eq.	Citric acid	2511.25.....	55.3
3 eq.	Magnesia.....	774.00..... ..	17.2
1 eq.	Water of Constitution...	112.50.....	2.5
10 eq.	Water of Crystallization	1125.00.....	25.0
		4522.75	100.0

There is the same quantity of oxygen in the water present as in the acid.

I propose the following preparation for the administration of citrate of magnesia :—

SEDLITZ WATER FREE FROM BITTERNESS,*

Or, Purgative Mineral Water of Citrate of Magnesia.

No. 1 (mild).

	grammes.	grains.
Citrate of Magnesia	40 =	617.360
Citric Acid	2 =	30.868
Simple Syrup	125 =	1929.252
Essence of Orange	q.s.	
Water charged with Carbonic Acid	q.s.	

to fill a common mineral water bottle, containing 750 grammes (about the size of a wine bottle).

No. 2 (strong).

	grammes.	grains.
Citrate of Magnesia	50 =	771.701
Citric Acid	$2\frac{1}{2}$ =	38.585
Simple Syrup	150 =	2315.103
Essence of Orange	q.s.	
Carbonic Acid Water.....	q.s.	

for a wine bottle.

The following is the formula for making 100 bottles of the above, each containing 50 grammes, or 771 grains of the citrate :—

Dissolve 6 pounds 9 ounces and 364 grains (avoirdupois weight) of crystallized citric acid in 22 pounds of water, and add to the solution 1 pound 5 ounces and 83 grains (avoird.) of calcined magnesia. When the combination has been effected, filter the solution, and add to it 33 pounds (avoird.) of simple syrup flavoured with essence of orange. Distribute this solution in one hundred wine quart bottles.

Then—

* The common *seidlitz water*, as made on the continent, contains sulphate of magnesia.

Precipitate 2 pounds 10 ounces and 145 grains (avoird.) of sulphate of magnesia, with a sufficient quantity of carbonate of soda, in the usual way; wash the precipitate, put it into a proper apparatus, with about 90 pints of water, and pass carbonic acid through it until the magnesia is dissolved. This being effected, use the solution thus formed to fill up the bottles into which the previous solution has been put.

Report by Messrs. Renauldin and Soubeiran on the above Mineral Water.

The proportion of magnesia in the citrate is sensibly the same as that in an equal weight of the crystallized sulphate, but the former salt is not so powerful in its medicinal effects as the latter, the fifty grammes or 771 grains of citrate contained in the bottle of mineral water, being about equal in effect to thirty or thirty-five grammes (463 or 540 grains) of crystallized sulphate.

Notwithstanding the large quantity of citrate in the mixture, the taste does not at all indicate the presence of any salt; it resembles lemonade in flavour, and acts as a purgative, quite as well as the ordinary seidlitz water. It certainly affords, from its agreeable taste, a good method of overcoming the repugnance of some patients to purgative medicines. It occasions neither thirst nor tenesmus, and but little pain during its operation, it may therefore be said that it operates safely and agreeably. Our observations would indicate that the proper dose of the salt is forty-five grammes (694 grains) for a man, and forty grammes (617 grains) for a woman.

In the preparation of the magnesia lemonade according to the above formula, the first part of the operation consists in making a citrate of magnesia with excess of acid. In the second part of the process, part of the free citric acid is saturated with the carbonate of magnesia, carbonic acid being at the same time set free so as to make it an effervescent water, while there is sufficient uncombined citric acid to give it an acidulous taste.—*Journal de Pharmacie.*

ON A NEW TEST FOR PRUSSIC ACID,

And on a simple Method of preparing the Sulphocyanide of Ammonium.

BY PROFESSOR LIEBIG.

When some sulphuret of ammonium and caustic ammonia are added to a concentrated aqueous solution of prussic acid, and the mixture heated with the addition of pure flowers of sulphur, the prussic acid is converted in a few minutes into sulphocyanide of ammonium. This metamorphosis depends on the circumstance, that the higher sulphurets of ammonium are instantly deprived by the cyanide of ammonium of the excess of sulphur they contain above the monosulphuret: for instance, if a mixture of prussic acid and ammonia be added to the pentasulphuret of ammonium, the solution of which is of a deep yellow colour, and the whole gently heated, the sulphuret of ammonium is soon decolorized; and when the clear colourless liquid is evaporated, and the admixture of sulphuret of ammonium expelled, a white saline mass is obtained, which dissolves entirely in alcohol. The solution yields, on cooling or evaporation, colourless crystals of pure sulphocyanide of ammonium. Only a small quantity of

sulphuret of ammonium is requisite to convert, in the presence of an excess of sulphur, unlimited quantities of cyanide of ammonium into sulphocyanide; because the sulphuret of ammonium, when reduced to the state of monosulphuret, constantly reacquires its power of dissolving sulphur and transferring it to the cyanide of ammonium. The following proportions will be found to be advantageous :—two ounces of solution of caustic ammonia of 0.95 specific gravity are saturated with sulphuretted hydrogen gas ; the hydrosulphate of ammonia thus obtained is mixed with six ounces of the same solution of ammonia, and to this mixture two ounces of flowers of sulphur are added ; and then the product resulting from the distillation of six ounces of prussiate of potash, three ounces of the hydrate of sulphuric acid, and eighteen ounces of water. This mixture is digested in the water-bath until the sulphur is seen to be no longer altered and the liquid has assumed a yellow colour ; it is then heated to boiling, and kept at this temperature until the sulphuret of ammonium has been expelled and the liquid has again become colourless. The deposited, or excess of, sulphur, is now removed by filtration, and the liquid evaporated to crystallization. In this way from $3\frac{1}{3}$ to $3\frac{1}{2}$ ounces of dazzling white dry sulphocyanide of ammonium are obtained, which may be employed as a reagent, and for the same purposes as the sulphocyanide of potassium. Of the two ounces of sulphur added, half an ounce is left undissolved.

The behaviour of the higher sulphurets of ammonium towards prussic acid furnishes an admirable test for this acid. A couple of drops of a prussic acid, which has been diluted with so much water that it no longer gives any certain reaction with salts of iron by the formation of Prussian blue, when mixed with a drop of sulphuret of ammonium and heated upon a watch-glass until the mixture has become colourless, yields a liquid containing sulphocyanide of ammonium, which produces with persalts of iron a very deep blood-red colour, and with persalts of copper, in the presence of sulphurous acid, a perceptible white precipitate of the sulphocyanide of copper.—*Liebig's Annalen, Jan.*, 1847, and *Chemical Gazette.*

EXPERIMENTS ON PROFESSOR LIEBIG'S NEW TEST FOR PRUSSIC ACID,

WITH REMARKS ON ITS APPLICATION IN MEDICAL JURISPRUDENCE.

BY ALFRED S. TAYLOR, F.R.S.,
Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital.

(*From the London Medical Gazette, April*, 1847.)

In a paper lately published, a short translation of which has appeared in the *Chemical Gazette*,* Professor Liebig has suggested an entirely new process for the detection of prussic acid. He remarked, that, when a concentrated aqueous solution of this acid was heated with ammonia and an excess of sulphur, the prussic acid was speedily converted to sulphocyanide of ammonium, which was easily procured in a crystalline state on evaporation. Thus the persulphurets of ammonium, when boiled with prussic acid, lose their yellow colour, owing to the union of the sulphur with cyanogen to form sulphocyanic acid. In applying this process for the testing of prussic acid, the Professor states, that "a couple of drops of an acid which has been diluted

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* April 1, 1847.

with so much water that it no longer gives any certain reaction with a salt of iron by the formation of Prussian blue—when mixed with a drop of sulphuret of ammonium, and heated in a watch-glass until the mixture has become colourless, yields a liquid containing sulphocyanide of ammonium, which produces, with persalts of iron, a very deep blood-red colour."

The prussic acid which I employed in the following experiments was first accurately examined as to its strength. Two hundred grains gave by precipitation with nitrate of silver 14.3 grains of dry cyanide of silver. This would be equal to 2.88 grains of anhydrous prussic acid, or 1.44 grains per cent.

Prussic Acid.—Two drops of this acid (=.028 gr., or about 1.36th of a grain of anhydrous acid) were placed in a watch-glass and heated with a drop of the common hydrosulphuret of ammonia. When the liquid had entirely lost its yellow colour, an opaque film appeared on the glass; and, on adding one drop of a solution of persulphate of iron, an intense *blood-red colour* was immediately produced. The colour was entirely destroyed, and the liquid became colourless, on the addition of two or three drops of a solution of bichloride of mercury. It was thus evident that the prussic acid and hydrosulphuret of ammonia had reacted upon each other, producing sulphocyanate of ammonia, and a thin film of sulphur, which might have been easily separated, but it did not in the least degree interfere with the chemical reaction upon which the operation of the test depended.

Chemical Changes.—The common hydrosulphuret of ammonia employed ($N H_3 H S$, or $N H_4, S + H S$) was of a yellow colour; the ammonium was therefore most probably in the state of bisulphuret ($N H_4, S_2$) one equivalent of hydrogen having combined with the oxygen of the air. Admitting this to be the composition of the hydrosulphuret, although ammonium has, like potassium, several degrees of sulphuration, the chemical reaction may be explained by the following formula:—

$$N H_4, S_2 + H, Cy + O = N H_3, Csy + H O \text{ or } N H_3, Cy S_2 H + H O.$$

The slight residue of sulphur may have been owing to the hydrosulphuret being in excess, compared with the quantity of prussic acid present. From the substances employed, and the results, it is evident that if the boiling and evaporation be not carried far enough, the persalt of iron will be precipitated by the undecomposed hydrosulphuret of ammonia; and, if the heat be carried too far, the sulphocyanate of ammonia may itself undergo decomposition.

Diluted Prussic Acid.—The prussic acid employed in the previous experiment was now much diluted with water. Two drops of the acid were thoroughly diffused in 220 grains of distilled water; and each grain of this mixture would therefore contain no more than 1-7860th (220 ÷ .028) of a grain of anhydrous acid.

In order to compare the effect of the new with the old tests, ten minims of this very diluted acid were tried with the common Prussian blue test. The liquid acquired a yellowish tint; but after several hours there was no perceptible deposit of Prussian blue. Thus the iron test failed entirely to detect the 1.786th of a grain of prussic acid in ten minims of water. It required one drachm and a half of this diluted acid (=1.87th grain) to produce after twenty minutes a perceptible deposit of a Prussian blue of a greenish colour. A like quantity (ten minims) was taken, and a solution of nitrate of silver added to it. There was only a faint opalescence, but no deposit of cyanide of silver. The silver test therefore failed in detecting the 1-786th of a grain of the acid; for the production of a faint opalescence, could not be regarded as indicative of the presence of the poison. The effect of this test became apparent with one drachm of the diluted acid (=1-131 part of a grain), but still there was no visible deposit of cyanide of silver.

It need hardly be remarked that in this highly diluted condition there was not the least perceptible *odour* of the poison†.

Two minims of the diluted acid were now placed in a watch-glass with one minim of diluted hydrosulphuret of ammonia, and gently evaporated to dryness. A drop of the persulphate of iron added to the residue, gave immediately a reddish tint indicative of the presence of sulphocyanic acid or a sulphocyanate. The quantity of anhydrous acid which was here clearly detected by the test, was not more than 1-3930th of a grain! (7860÷2.) It was evident therefore from these results that Professor Liebig had not exaggerated the delicacy of this valuable test. It is capable of indicating the presence of prussic acid when no odour can be perceived, and when the iron and silver tests fail to act with any degree of certainty.

The reader will perceive that the cause of this highly delicate reaction is, that we obtain the residue as a solid, and therefore in a most concentrated state. There is no water to dilute or destroy the intense blood-red colour characteristic of the sulphocyanate of iron. Hence the chemical changes are most perfectly brought out on the smallest visible quantity of residue. The only precaution required is, not to add too much of the persulphate of iron; a fractional part of a drop will commonly suffice. The salt of iron should be used in a concentrated state, and as neutral as possible.

The application of Professor Liebig's process, however, presupposes that the experimentalist has the prussic acid in a free and pure condition. In medico-legal practice, the poison, as we know, is liable to be mixed up with mucus, blood, articles of food, and other matters. It would be impossible to employ the test under these circumstances. It would always be necessary to distil the contents of the stomach or vomited matters; and from the numerous objections which have been taken to medical evidence, it is decidedly advisable to avoid the process of distillation, until *after* the poison has been clearly detected without it. It may then be required, not to determine the presence of prussic acid, but the *quantity* contained in the suspected liquid. Further, supposing the contents of the stomach to be in a decomposed state, or to contain hydrosulphuret of ammonia, a body which I have on several occasions found in them, it is clear from the foregoing experiments that the application of heat would cause any prussic acid to react upon the sulphur compounds, and to form a fixed sulphocyanate, so that none of the poison might pass over into the receiver.

In a paper published in this journal, in June, 1845‡, I suggested a plan for detecting prussic acid without distillation, by taking advantage of its great volatility, and the action of its vapour on a solution of nitrate of silver. The experiments there related, as well as those performed by Mr. Hicks §, show that this is a most delicate mode of testing, and that it is open to no practical objection‖. I have found, however, in testing putrescent liquids, and animal matter containing prussic acid, that the nitrate is darkened by

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† I have elsewhere shown, with respect to the action of nitrate of silver on a solution of prussic acid, that it will produce a milkiness with the 4000th of a grain of anhydrous acid in a minimum of water; but it only begins to give a decided precipitate with the 220th of a grain in about 13,000 parts of water.—*Guy's Hospital Reports*, April, 1845.

‡ *Medical Gazette*, vol. xxxvi., p. 328.

§ *Ibid*, p. 631.

‖ Although the vapours of muriatic acid, when in a certain strength (never found naturally in the body), produce also a white film on a solution of nitrate of silver, I have since found that these are easily known from those caused by prussic acid, by the rapid darkening under exposure to light. The thin film of cyanide is soluble in an excess of strong nitric acid—that of the chloride is not.

the sulphur; and the reaction of the hydrocyanic acid is no longer clear or certain. This mode of employing nitrate of silver, led me to the trial of a similar plan for the detection of prussic acid by the hydrosulphuret of ammonia.

Modification of the test.—Place the diluted prussic acid in a watch-glass, and invert over it another watch-glass, holding in its centre one drop of the hydrosulphuret of ammonia. There is no apparent change in the hydrosulphuret; but if the watch-glass be removed after the lapse of from half a minute to ten minutes, according to the quantity of prussic acid present, sulphocyanate of ammonia will be obtained on gently heating the drop of hydrosulphuret and evaporating it to dryness. The addition of persulphate of iron to the dried residue brings out the blood-red colour instantly, which is intense in colour in proportion to the quantity of sulphocyanate present. Such is the simple method of employing the test; it is wholly independent of distillation, and (unless the prussic acid be excessively diluted) of any application of heat. In this case the warmth of the hand may be required to expedite the evolution of the vapour.

Whatever proportion of acid may be detected by the mixture of the two liquids, as suggested by Professor Liebig, may with equal certainty be discovered by this process. Thus two drops of the highly diluted acid just now mentioned, gave, after a few minutes' exposure to the hydrosulphuret, a clear reaction; while it was found that a drop of solution of nitrate of silver placed in a watch-glass and inverted over that containing the diluted acid, gave no opaque film (cyanide of silver), until after the lapse of half an hour! Hence the process is even more delicate than that of the reception of the vapour on a solution of nitrate of silver, as suggested in a former communication to this journal*.

The two tests may be usefully employed together. If a suspected liquid, placed in a watch-glass, produce a film on a drop of nitrate of silver, the reaction will be very speedy with the hydrosulphuret. The silver test acts *visibly*, and therefore serves to guide us: the hydrosulphuret acts invisibly; for there is no apparent change unless the glass be left so long that the ammonia is spontaneously evaporated, and the sulphur oxidated or deposited. If the suspected liquid produce, after half an hour, no effect by its vapour on a drop of nitrate of silver, it is very probable that no prussic acid is present; nevertheless, we should proceed to apply the hydrosulphuret of ammonia, as I have found the poison by it when nitrate of silver had entirely failed to indicate its presence.

Rapidity of Action.—Twenty drops of prussic acid, so diluted as to have a strength in anhydrous acid of only 0.48 per cent., therefore rather less than one-fourth the strength of the London Pharmacopœia acid, were placed in a watch-glass. On inverting over it another watch-glass containing a drop of nitrate of silver, it was whitened immediately; a drop of hydrosulphuret of ammonia was then substituted. By two separate trials, sulphocyanate was found to have been formed in *ten seconds*, and the effect was very strong in thirty seconds; the quantity of anhydrous prussic acid here detected was .096 gr., or about 1-12th of a grain. It would be in general advisable to expose the hydro-sulphuret to the vapour for one or two minutes, and when the acid is very diluted for from ten minutes to half-an-hour. The following experiment will, however, show that the absorption is extremely rapid, even when the acid is much diluted. Three drops of the prussic acid above employed were diffused through two drachms of distilled water; no odour whatever could be perceived in this mixture; ten drops were placed in a watch glass, and nitrate of silver was speedily whitened by the vapour. The effect with hydrosulphuret of ammonia was distinctly pro-

* *Medical Gazette*, vol. xxxvi, p. 328.

cured in five minutes; the total quantity of anhydrous acid present in the ten drops of liquid, did not exceed the 1-473d part of a grain!

Laurel Water.—A very weak specimen of laurel water was next examined. Nitrate of silver produced no perceptible effect with one drachm of it when the liquids were mixed, nor could any Prussian blue be procured from a like quantity by the use of the iron test. One drop of hydrosulphuret of ammonia added to three drops of the water, gave the clearest evidence of prussic acid by the production of the red sulphocyanate of iron, when the persulphate was added to the evaporated residue. From five to ten drops placed in a watch-glass, produced no film (by the vapour) on nitrate of silver after the lapse of twenty minutes: in the same period of time, one drop of hydrosulphuret of ammonia absorbed the vapour, and left, on evaporation, a perceptible quantity of sulphocyanate.

Bitter Almond Water.—Two specimens of this water, prepared by the distillation of bruised bitter almonds with water, were tried merely by volatility, as it was certain that if this experiment succeeded, the mixture of liquids could not possibly fail. With one specimen, after half an hour, no effect had been produced on nitrate of silver; and on trying the hydrosulphuret, no sulphocyanate of ammonia was detected in the evaporated residue. Two drachms of this water gave no perceptible precipitate with nitrate of silver, nor could any Prussian blue be obtained by adding the iron test to a similar quantity of liquid. The second specimen of bitter almond water which was slightly precipitated by nitrate of silver, and affected that liquid by its volatility, gave decided evidence of prussic acid in *three minutes*, by the hydrosulphuret of ammonia.

Bitter Almonds.—It is not easy to detect the prussic acid, evolved by the admixture of water, in the pulp of *one* bitter almond; the iron test gives, however, a blue deposit (Prussian blue) after some hours. The pulp obtained from *one-half* of a bitter almond, bruised with water, faintly affected nitrate of silver by its volatility, but in a quarter of an hour gave clear evidence of prussic acid with the hydrosulphuret of ammonia.

Essential Oil of Bitter Almonds.—The vapour of this oil, if long kept, only faintly affects nitrate of silver by its volatility; and does not readily give a precipitate of cyanide of silver on the addition of this test; *one drop* of the oil gave, in a few minutes, distinct evidence of prussic acid, in absorbing its vapour by hydrosulphuret of ammonia.

Decomposed Prussic Acid.—This was a specimen which had been kept three years; it was quite blackened, and in a thick and syrupy condition; it produced by its volatility an opaque film in a few seconds, and the prussic acid, still remaining in it, was detected in an equally short period by the hydrosulphuret.

Hydrocyanate of Ammonia.—The combination of prussic acid with alkaline bases does not prevent this delicate reaction. To one drop of the acid employed, two drops of a moderately strong solution of ammonia were added; the liquid was strongly alkaline. Nitrate of silver was rendered opaque by its vapour, and the hydrosulphuret gave the usual evidence of the acid in a few minutes. When a very large excess of strong solution of ammonia was added, there was no effect on exposing to the vapour the nitrate of silver or the hydrosulphuret; but by diluting the liquid, and then acidulating it with diluted sulphuric acid, satisfactory results were obtained with both tests in a few minutes.

Cyanide of Potassium.—A single grain of this salt moistened with water, forming a strong alkaline solution, gave by its vapour a well-marked action on the silver and hydrosulphuret in a few seconds. An alkali, therefore, does not fix the acid so as to prevent the action of the tests. This is important in examining decomposed organic liquids, or those into which we do not wish to introduce an acid.

Cyanides of Silver and Mercury.—Half a grain of each of these salts moistened with strong muriatic acid gave characteristic reactions with both tests in a few seconds. Any visible quantity of either cyanide in small glasses would suffice to give evidence. This is an excellent and easily applied experiment for determining the nature of a precipitate supposed to be cyanide of silver, when a sufficient quantity cannot be obtained for the combustion of cyanogen, and we are unwilling to trust to odour alone. While it is much more easily applied than that suggested by Dr. Austin, of heating the precipitate with iron and potassium, the results are just as satisfactory. Prussian blue not being easily decomposed by muriatic acid, produced no effect with the tests. This compound might, if required, be examined by digestion in potash, pouring off the ferrocyanide of potassium, and adding sulphuric acid.

Ferrocyanide of Potassium.—A grain of this salt in powder mixed with water and strong sulphuric acid, on the application of a moderate heat yielded a vapour which affected the silver and the hydrosulphuret in two or three minutes. The last experiments resorted to were perhaps the most important in a medico-legal point of view.

In Decomposed Organic Liquids.—The putrefied contents of the stomach of a female who had died under a suspicion of irritant poisoning, about three weeks before, were taken for the first experiment. The odour was highly offensive—acetate of lead was immediately blackened by the vapour, and the trial test of silver was also blackened by the sulphur : consequently in this case it could not be used for the detection of prussic acid. To *one drachm* of this offensive liquid, *one drop* of the acid employed (= .014 or 1—71 of a grain of anhydrous prussic acid) was added, and a watch-glass, with hydrosulphuret of ammonia, was placed over it. In a few minutes the presence of prussic acid was most satisfactorily detected.

To an equal portion of decomposed vomited matter, consisting of blood, mucus, bile, and other substances, *one drop* of the acid was added ; and when the hydrosulphuret was exposed to the vapour, the results obtained were equally satisfactory. Nitrate of silver could not be employed in this case, as it was immediately blackened by the vapour.

It will thus be seen that the process is more delicate, more speedily and universally applicable, and more certain and unobjectionable in its results, than any of those yet suggested for the detection of this powerful poison. To Professor Liebig belongs the merit of this discovery, and by announcing it he has placed in the hands of Chemists a means of tracing crime in cases in which our present resources would have entirely failed us. He has here done for prussic acid what Reinsch has recently done for arsenic ; the analysis may be made during the post-mortem examination of a body ; and the result relied on as conclusive, both affirmatively and negatively.

Objections.—I am not aware of any objections to this process for detecting prussic acid, when we absorb the vapour of the acid previously to distillation by hydrosulphuret of ammonia. There must be some compound of cyanogen capable of uniting with sulphur to form sulphocyanic acid, and capable of being evolved from a body at common temperatures in a few seconds in order to produce the effects described ; and, so far as I am aware, no such body exists. If it did, and these results were obtained, they would still furnish a proof of its containing a powerful poison—cyanogen. I have not had an opportunity of trying the bromide and iodide of cyanogen : but these compounds are well characterized by other properties, and are not likely to be confounded with hydrocyanic acid. The preliminary test of nitrate of silver will besides aid us in many cases which might present some apparently ambiguous results. The sulphocyanic acid exists in the saliva, but as it is combined with a base it cannot be volatilized at common temperatures so as to mix with the hydrosulphuret, and lead to deception. As white mustard

contains a principle (sulphosinapisin) capable of being converted to sulphocyanic acid, a quantity of the seed was bruised, placed in a watch-glass, and exposed to hydrosulphuret of ammonia. The pulp immediately acquired a yellowish tint from the vapour of the ammonia, but after a quarter of an hour's exposure to the hydrosulphuret, it left no sulphocyanate on evaporation. On pouring some persulphate of iron on the pulp it acquired a dingy red colour.

The proof, therefore, of the presence of prussic acid by this process is based on two facts: 1st, The great *volatility* of a cyanogen compound in a state fitted to combine with sulphur to form sulphocyanic acid; and 2d, The production of an intense *red colour* with a persalt of iron capable of being entirely destroyed by a few drops of bichloride of mercury. I believe that there is no substance known to Chemists which fulfils these conditions except prussic acid: hence no other test is required for the poison. The Prussian blue test may be occasionally employed as corroborative; and I have found that a useful method of applying it is to precipitate the mixed oxides from the green sulphate in a gelatinous form, and to expose them to the vapour of the acid in a watch-glass.

It must be understood that the new test merely demonstrates the *presence* of the poison. For a quantitative analysis, distillation, and the use of the nitrate of silver must still be resorted to. If distillation be employed qualitatively, a small quantity of hydrosulphuret of ammonia might be placed in the receiver in order to fix the vapour when the quantity of poison was small.

It may be proper to state, that if the hydrosulphuret of ammonia have absorbed no prussic acid, it gives before evaporation a black precipitate with persulphate of iron; if it be evaporated until the yellow colour has disappeared, should no sulphocyanate be present, there is merely a yellow tint from the separation of sulphur. Other alkaline sulphurets may be substituted for the hydrosulphuret of ammonia, but they must be always in the state of polysulphuret and the chemical reaction with prussic acid is never perfect until after heat has been applied to the mixed liquids, or to the sulphuret which has absorbed the vapour.

ANALYSIS OF BODIES CONTAINING NITRIC ACID,

And its Application to Explosive Cotton.

BY WALTER CRUM, F.R.S.

(*From the Philosophical Magazine and Journal of Science.*)

At the first meeting of the present Session of the Philosophical Society, I gave an account of some experimental inquiries into the nature of gun-cotton, a body whose composition was then little known. I had at that time chiefly occupied myself with its nitrous contents, and described a method by which some approximation could be made to a quantitative result for nitric acid. On resuming the subject, I found that much was wanting to render the method a rigorously accurate one; and I shall now relate what I have since done to simplify and complete it. I shall first, however, give an account of its application to nitrate of potash—a body of known composition, and easily obtained in a state of purity—to which I had recourse as a means of proving the accuracy of the method, and detecting any fallacy to which it might be liable.

Nitric Acid in Nitrate of Potash.—The salt I employed was purified by repeated crystallization, and fused at little more than its melting heat. A glass jar, eight inches long and an inch and a quarter in diameter, is filled with and inverted over mercury. A single lump of the fused nitrate, weighing about six grains, is let up into it, and afterwards fifty grains of water.

As soon as the nitrate is dissolved, 125 grains of sulphuric acid, ascertained to be free from nitric acid, are added. By the action of the mercury upon the liberated nitric acid, deutoxide of nitrogen soon begins to be evolved, and usually in about two hours, without the application of heat, the whole of the nitric acid is converted into that gas. Occasionally agitation is necessary, and it is easily performed by giving a jerking horizontal motion to the upper part of the jar. The surface of the sulphuric acid is then marked, and three-fourths of a cubic inch of solution of sulphate of iron, recently boiled, let up into the jar. The gas is rapidly absorbed, except a small portion at last, which must be left several hours to the action of the solution, or be well agitated in a smaller tube with a fresh portion of it. No correction of the nitric oxide has to be made for moisture; for the mixture of acid and water which I employed, as I ascertained by direct experiment, has no perceptible force of vapour. In one experiment,

5.40 grains nitrate of potash yielded
4.975 cubic inches of gas, at 60° Fahr., and bar. 30 inches.
The residue not absorbable by sulphate of iron, was
0.015 cubic inch; leaving
4.96 cubic inches of nitric oxide=1.594 grains NO_2, and which correspond to
2.869 grs. nitric acid, or 53.13 per cent. of the nitrate of potash.

Four consecutive experiments made in this manner yielded—

53.13
53.14
53.73
53.29

Mean 53.32

or leaving out the third experiment, 53.19.

The calculated per centage of nitric acid in nitrate of potash, the acid being represented by 6.75, and the potash by 5.8992 is 53.36.*

In order further to determine whether the presence of organic matter would interfere with the liberation of the nitric oxide, the experiment was repeated with the addition of three grains of cotton wool, which was first dissolved in the sulphuric acid; the result was 53.24.

Other nitrates are analysed in the same manner. For salts in powder, which it is difficult to pass through mercury without loss, I cut a quarter-inch glass tube into little cylinders for them, of half-an-inch long, and close up the ends with thin paper fastened with gum. In the analysis of numerous samples of crude nitrates, the residue, which is azote, may be taken as a constant quantity, and the jar graduated in such a manner that the volume of gas may be read off at once as the per centage of nitric acid.

Preparation of Gun-Cotton.—The cotton I employed was fine Sea Island. It was first thoroughly carded, and then bleached, by boiling in caustic soda, and steeping in solution of bleaching powder; then caustic soda again, and afterwards weak nitric acid. It was well washed and beaten in a bag with water after each operation. When burnt, 10,000 parts left nine of ashes. It was considered to be lignine, nearly pure.

The cotton, dried and carded after bleaching, was exposed in parcels of ten grains each, for several hours, to the heat of a steam-bath, and each parcel was immersed, while hot, in an ounce measure of the following mixture:

One measure sulphuric acid, spec. grav., 1.840.
Three measures of pale lemon-coloured nitric acid, of 1.517. After one

* By Thomson's numbers the per centage of nitric acid in nitre is 52.94; by Berzelius, 53.44.

hour it was washed in successive portions of water, till no trace of acid remained, and dried in the open air.

30 grs. of bleached cotton wool, dried at 65° F., became, after being some hours in a steam bath,

28.32 grs., and lost, therefore, 5.6 per cent. of water. It increased to

51.08 grs. when made into gun-cotton, and dried in the open air.

Dried further *in vacuo*, over sulphuric acid, it was reduced to

50.40 grs., and lost, therefore, 1.33 per cent. of water.

100 of dry cotton produced 177.9 of dry gun-cotton.

The gun-cotton thus prepared is whiter, but less transparent, than the original bleached wool. It appears to be little liable to change, but a slight elevation of temperature causes a commencement of decomposition, and the colour becomes more or less brown. It is much less tenacious than cotton wool. Dissolved in nitric acid, and tested with chloride of barium, it gives no indication of sulphuric acid.

The increase of weight above stated is the greatest I have been able to obtain; and I had completed its analysis in the manner I shall describe, when I found reason to believe that it still contained a portion of unaltered cotton. With a view to saturate that portion, it was immersed a second time, and for twenty-four hours, in the same mixture of acids, but without yielding any greater quantity of nitric acid.

An immersion of one hour in nitric acid alone gave a better result. It lost in weight by this second process 0.47 per cent. It was little altered in appearance, but after being dried in the open air, it lost in the air-pump only 0.69 per cent., instead of 1.33, as in the former case. It is this substance of which I shall now relate the analysis.

Ashes in Gun-Cotton.—Sixteen grains of gun-cotton were dissolved in nitric acid. The solution being evaporated by degrees, and burnt to ashes, left 0.035 gr. of a reddish ash, or 0.22 per cent.

Nitric Acid in Gun-Cotton.—In this process the same apparatus is employed as for nitrate of potash. About six grains of the gun-cotton, containing a known quantity of water, is collected into a ball—squeezed between the finger and thumb to free it as much as possible from air—and let up into the jar, over the mercurial trough. 125 grains of sulphuric acid are added to it. Nitric acid is liberated, and, being acted upon by the mercury, produces nitric oxide. After one hour, when about three-fourths of the whole gas has been evolved, and the gun-cotton is entirely dissolved, fifty grains of water are added. In another hour the increase of gas ceases; in a few hours more its boundary is noted, then treated with sulphate of iron, and the residue measured. It consists of azote from the common air introduced with the gun-cotton, and a minute portion also, which is always accidentally entangled between the mercury and the glass. Its oxygen is absorbed by the mercury, when in the state of nitrous acid.

In one experiment—

6.02 grs. of gun-cotton=5.978, after being dried over sulphuric acid *in vacuo*, and =

5.964 grs., after deducting ashes, produced

5.513 cubic inches of gas, bar. 30 in., therm. 60°, of which

0.08 was left by sulphate of iron.

5.433 cubic inches, therefore, were deutoxide of nitrogen, =

1.746 grs. NO_2, which represent

3.143 grs. of nitric acid, or 52.70 per cent.

Another experiment gave 52.68 per cent.

The gun-cotton prepared by a single immersion gave only 51.42 per cent. of nitric acid.

Carbon in Gun-Cotton.—Having failed to obtain good results by burning this substance with oxide of copper, I used chromate of lead, precipitated

from the nitrate, and heated to redness. I employed for the combustion an apparatus which I used many years ago for the analysis of indigo, and I still find it very convenient for substances which do not require a strong red heat. It consists of a tube of hard glass, eight inches long and three-eighths of an inch in diameter; the gases from which are led by a small bent tube under the receiver in a mercurial trough.

One inch at the closed end of the tube is filled with eight grains of chlorate of potash, ground with chromate of lead.

Four and a half inches are filled with chromate of lead, among which is ground to powder three grains of the gun-cotton.

One and a half inch contains chromate of lead that has been used to wash out the mortar.

A glass plug separates these materials from the perforated cork which joins the two tubes. The materials are gradually heated with broad-wicked spirit lamps. Carbonic acid comes over, mixed, when in the receiver, with nitric oxide and the azote of the apparatus; and when all the gun-cotton is consumed, the lamps are extended to the chlorate of potash. The oxygen gas thus liberated, which in other cases is useful to consume carbonaceous matter that may have escaped the chromate, expels in this case all remains of carbonic acid, and passing itself into the receiver, mixes there with the nitric oxide, and causes its entire absorption by the mercury. Oxygen and azote are then the only gases left along with the carbonic acid, and as those are not absorbable, an addition of half a cubic inch of solution of caustic soda indicates exactly the quantity of carbonic acid present.

In one experiment, 2.993 grs. of gun-cotton (after deducting water and ashes) yielded 7.952 cubic inches of gas, of which 5.733 was carbonic acid, =0.739 grs. carbon, or

24.69 per cent.

A second experiment gave.....25.16

Mean..... 24.92

Elements of Water in Gun-Cotton.—To burn gun-cotton for the purpose of collecting its oxygen and hydrogen in the state of water, I ground up ten grains of it with pounded flint, and used the combustion tube already described, having attached to it a chloride of calcium tube, and afterwards a tube with abestos moistened with sulphuric acid. But along with water, ammonia and other matters were obtained, which destroyed the result. I next used a thin glass tube of a foot and a half long, bent so that a foot in the middle of it could dip into cold water. Such water as would condense at 65° Fahr. was collected. The gas was led through it into a mercurial trough and measured. A trace of cyanogen appeared in the last portions of gas, while the oxygen from the chlorate of potash was burning a quantity of charcoal that had escaped the nitric acid.

After the experiment, the refrigerating tube was found studded with large crystals of bicarbonate of ammonia. It contained very little water in the liquid state. The crystals and the liquid were washed out with more water, converted into muriate of ammonia, and found to contain 0.675 gr. NH_3 $2CO_2$, the hydrogen of which represents

0.299 gr. of water. There were besides
2.025 grs. water in the tube. In the 22 inches of gas which were obtained, assuming it to be saturated with moisture, which is doubtful, there was
0.088 gr. of water—making in all

2.412, from which must be deducted
0.160 gr. hygrometric water in the gun-cotton and in the flint, leaving

2.252 for the water in 9.92 grs. of dry gun-cotton, or 22.70 per cent.

In a second experiment, where the only difference was in having moistened cotton for the gas to pass through before entering the mercurial trough, the water obtained only amounted to 20.61 per cent. I did not proceed further. These were the two last of a number of experiments, and the determinations of nitric acid and carbon are so much more satisfactory, that I prefer resting the water contents upon their results.

Purified cotton wool (lignine) is composed of $C_{12}\ H_{10}\ O_{10}$. During its transformation into gun-cotton, there is no indication of change in the proportions of its oxygen and hydrogen. The difference, therefore, between the weight of the substance employed and that of the nitric acid and carbon found by experiment, is oxygen and hydrogen in the proportions which form water.

The experiments I have related give the following for the composition of gun-cotton :—

52.69	nitric acid,
24.92	carbon, and leave
22.39	for the elements of water.
100.00	

These numbers are nearly in the proportions of 12C, 7HO, $3NO_5$.

Found.	Calculated.
52.69	52.69= $3NO_5$.
24.92	23.41=12C.
22.39	20.49= 7HO.
100.00	96.59

Leaving a remainder of 3.41 per cent., consisting of 1.51 carbon, and 1.90 water. These, however, are nearly the proportions which form lignine.

Found.	Calculated.	
1.51	1.51=12C	} =lignine.
1.90	1.88=10 HO	}

Gun-cotton, from the form in which it is produced, is not one of those substances we can expect to obtain in absolute purity. Every previous improvement in its preparation had diminished this excess of unaltered cotton, and I had no reason to suppose the last portion perfect, considering the difficulty with which some of the previous stages of improvement had been attained.

The specimen I have thus examined consists, therefore, of—

96.59	gun-cotton (12C, 7H, 7O, $3NO_5$).
3.41	lignine (12C, 10H, 10O).
100.00	

And pure gun-cotton consists of—

24.24=12C.	24.24=12C.
21.21= 7HO.	2.36= 7H.
54.55= $3NO_5$.	14.14= 3N.
	59.26=22O.
100.00	100.00

It is lignine in which three atoms of water are replaced by three atoms of nitric acid.

ON THIALDINE AND SELENALDINE,

TWO NEW ARTIFICIAL ORGANIC BASES.

BY WÖHLER AND LIEBIG.

1. *Thialdine.*

The peculiar deportment of hydrated cyanic acid with aldehyde, which gives rise to a new acid containing the elements of aldehydite of ammonia and hydrated cyanic acid, induced us to study the action of some other substances on aldehyde and aldehydite of ammonia.

The most interesting product which we obtained along with others, is a new organic alkali free from oxygen, and containing carbon and hydrogen in the same proportions as acetic acid, combined wth sulphur and the elements of sulphide of ammonium. This substance, which we call thialdine*, is highly remarkable from its composition, and we have no doubt that the method which led to its discovery, when applied to other compounds analogous to aldehyde and aldehydite of ammonia, will yield a long series of new and interesting products. The study of these substances promises to become highly important for the theory of the formation of organic bases, in which the action of ammonia is frequently very prominent, and it may be expected that a close investigation of the production of organic substances containing sulphur will throw some light upon their generation in the organism of the plant.

The preparation of thialdine is very simple. One part of aldehydite of ammonia free from æther and alcohol is dissolved in from twelve to sixteen parts of water ; one ounce of this liquid is mixed with from ten to fifteen drops of solution of ammonia, and treated with a slow stream of hydrosulphuric acid ; after half an hour the solution begins to become turbid, and crystals are deposited of the appearance of camphor and of considerable size ; after four or five hours the liquid again becomes clear and the operation is terminated. The crystals are collected on a funnel and washed with water until all the sulphide of ammonium is separated. Pressure between bibulous paper removes the adhering water. The dry crystals are dissolved in æther, the solution mixed with a third of its volume of alcohol and left to spontaneous evaporation. The liquid soon deposits very regular rhombic tables, which can be obtained of half an inch in dimensions if too rapid an evaporation of the solution has been avoided.

If no more of the solution is left than is required to cover the crystals formed, the mother liquid is decanted off; the crystals are then dried by leaving them for some time between folds of bibulous paper. The mother-liquor yields some more thialdine on evaporation. The crystals thus obtained are however not quite colourless. The remaining liquid contains much sulphide of ammonium, part of which arises from the ammonia added.

It happens sometimes that on passing hydrosulphuric acid gas through the solution of aldehydite of ammonia, no crystalline body, but a heavy colourless oil of offensive odour is deposited. This oil is a mixture of two bodies, the greater part being thialdine, the fusing point of which is depressed to the temperature of the atmosphere by the presence of a liquid substance†. In order to obtain pure thialdine from this mixture, the supernatant aqueous layer is separated, and the remaining liquid (consisting

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* Contracted from θεῖον and aldehyde.

† Crystals of thialdine when placed in contact with sulphide of ammonium for some time are entirely converted into a heavy oil, insoluble in water, which has not been further examined.

principally of the oil and but a small amount of the aqueous solution) is agitated with half its bulk of æther, which instantaneously dissolves the oil. The æthereal solution, which may be easily separated from the water, is agitated in a stoppered bottle with a little concentrated hydrochloric acid. The mixture generally solidifies as a mass of fine needles, which may be separated from the oil by washing with æther. In this manner hydrochlorate of thialdine is obtained, from which pure thialdine may easily be prepared by moistening the dry crystals with a concentrated solution of ammonia, and extracting the separated base by means of æther. The æthereal solution yields by spontaneous evaporation crystals of pure thialdine. Addition of alcohol to the æthereal solution facilitates the crystallization exceedingly ; the crystals become larger, more regular, and perfectly transparent.

Pure thialdine is heavier than water ; its specific gravity is 1.191 at 18° C. ; it forms large, transparent, colourless, shining crystals of the form of common gypsum, possessing a highly refracting power and a peculiar aromatic, but after some time very disagreeable odour. The crystals fuse at 43° C. ; the fused crystals solidify at 42° ; they are volatile at the temperature of the atmosphere without residue. Thialdine distils with the vapour of water, but is decomposed when distilled alone ; a heavy oil of offensive odour passes over, solidifying only partly, and after some time, whilst a brown syrupy residue containing sulphur is left in the retort. Thialdine in this respect resembles aldehydite of ammonia, which, though volatile itself, cannot be exposed to a higher temperature without decomposition. If a crystal of thialdine remains for several hours in an atmosphere containing acid vapours, such as is the case in the laboratory, a white envelope of fine silky needles is found at a certain distance from the planes of the crystals.

Thialdine is but little soluble in water ; it is soluble in alcohol, and much more so in æther ; when powdered it deliquesces at the common temperature in vapour of æther, or in an atmosphere containing vapour of æther.

An alcoholic solution of thialdine exhibits the following reactions :

With acetate of lead, at first no precipitate, but after some time a yellow deposit appears, which soon becomes red and finally black.

Nitrate of silver causes a precipitate, which at first is white, then yellow, afterwards black.

With chloride of mercury a white precipitate is produced, turning rapidly yellow.

With bichloride of platinum a dingy, yellow precipitate is thrown down after some time.

Thialdine has no reaction on vegetable colours ; it is soluble in all acids with which it combines, forming crystallizable salts ; the hydrochlorate and the nitrate are remarkable for the facility with which they crystallize, and for the beauty of the crystals.

Thialdine and its salts are decomposed when gently heated with a solution of nitrate of silver ; sulphide of silver is produced with disengagement of a combustible gas, easily inflammable and possessing the odour and all the properties of aldehyde ; namely, it is entirely absorbed by concentrated sulphuric acid and solution of potassia, the former becoming brown immediately, the latter remaining clear, but depositing when gently heated a yellowish-brown precipitate of resin of aldehyde, and assuming the peculiar and offensive odour which accompanies the decomposition of aldehyde under these circumstances.

When thialdine is ignited with lime, chinoline appears among the products of decomposition, which may be easily recognised by its characteristic odour and by its beautiful platinum salt.

With cyanide of mercury thialdine exhibits a peculiar comportment.

On mixing the two solutions a white precipitate is produced, which on boiling is converted into amorphous, black sulphide of mercury. If this decomposition takes place in a retort its neck becomes coated with fine crystalline needles, extremely volatile, insoluble in water but easily soluble in alcohol and æther. This new body, in which part or all the sulphur appears to be replaced by cyanogen, is formed in but small quantities, which up to this moment has prevented us from studying it any further.

The composition of thialdine is represented by the following formula:—

$$C_{12}\ H_{13}\ NS_4.$$

2. *Selenaldine.*

The existance of thialdine and the mode in which this base is formed, induced us to try the preparation of a corresponding selenium compound. We perfectly succeeded in obtaining that body : selenaldine, however, is so soon and easily altered, that we have not as yet been able to subject it to a more profound investigation.

Selenaldine was produced by passing into a concentrated solution of aldehydite of ammonia hydroselenic acid gas, disengaged from selenide of iron by means of sulphuric acid. In order to prevent the decomposition of hydroselenic acid by the oxygen of the atmosphere, the whole apparatus had been filled previously with hydrogen. The excess of the poisonous hydroselenic acid was condensed in a potassa apparatus. After some time the solution of aldehydite of ammonia begins to become turbid, and crystals of selenaldine are deposited. When the mass of crystals is no longer augmented, the excess of hydroselenic acid is expelled by a stream of hydrogen gas ; the solution of selenide of ammonium, covering the crystals, which soon turns red and deposits selenium, is now displaced by introducing a stream of cold water, free from atmospheric air, through one of the glass tubes connected with the bottle. The crystals are then collected upon a filter, pressed between folds of bibulous paper and dried over sulphuric acid.

Selenaldine, as it is deposited from the liquid in which it forms, presents itself in small colourless crystals, doubtless isomorphous with thialdine. In contact with the atmosphere it turns immediately yellow. This substance has a feeble but disagreeable odour ; it is slightly soluble in water, on which account it should not be washed too long. The aqueous solution and the last washings become soon turbid in contact with the atmosphere, and deposit an orange-yellow body. The same deportment is exhibited by the solution of selenaldine in alcohol and ether, in both of which it is easily soluble. In consequence of its being so easily altered, we did not succeed in obtaining this base in crystals from any of the solutions mentioned. On evaporating them *in vacuo* over sulphuric acid, the greater portion of the substance is volatilized with decomposition, the yellow body being likewise produced, while sulphate of ammonia is formed in the sulphuric acid. Also, when heated alone, selenaldine is decomposed, with disengagement of a gas of most offensive odour. Selenaldine is a base like thialdine ; it is soluble in dilute hydrochloric acid, and reprecipitated by ammonia as a crystalline mass. The hydrochloric solution also immeately decomposes with evolution of a most offensive odour. Selenaldine is dialtered in a similar manner by boiling with water. The yellow body, the formation of which seems to be always attended with a liberation of aldehydite of ammonia, when collected is orange-yellow, amorphous, soluble in alcohol and æther, and fuses, when heated with water, to a reddish yellow mass, which remains soft for a long time. When heated alone, this body is charred with evolution of an oil containing selenium and possessing a most offensive odour.

We did not obtain a decisive result when trying to produce a *telluraldine*,

the tellurium which we employed in the preparation of the hydrotelluric acid accidentally containing so large an amount of selenium, that merely selenaldine was deposited from the purple solution, containing, as it appeared, only telluride of ammonium. We intend to repeat this experiment with tellurium free from selenium.—(*Read before the Chemical Society, January 4th*, 1847.

ON THE USE OF ARTIFICIAL ULTRAMARINE FOR COLOURING SUGAR.

In France, artificial ultramarine is employed for giving to dragées, bonbons, &c. a pretty blue colour. But if the latter contain some acidulated juice, they assume a very disagreeable taste of sulphuretted hydrogen, although the colour remains equally brilliant. Chevallier succeeded in preventing this, without prejudice to the colour, by boiling the ultramarine, before employing it, with water acidulated by acetic acid, and then washing it with hot water.—*Journ. de Chem. Méd.*

ON THE ADULTERATION OF MASTICH.

BY X. LANDERER, OF ATHENS.

The common adulterations of mastich with olibanum, sandarac, and similar substances, are well known ; but for several years, during which the mastich harvests have been scanty in Chios, it is often adulterated with sea-salt ; and in the bazaar at Athens, some of this adulterated mastich was exposed for sale, which contained sixteen per cent. of this salt, and which required some attention to distinguish from tears of mastic.

ON CUSCO BARK.

China Cusco, according to Holl, is best recognised by a transverse section, on which, if examined with a glass, greyish-black horn-like spots are perceptible on a deep reddish-brown ground, with a white centre, which are met with in no other kind of bark.—*Pharmaceutisches Central Blatt.*

SPURIOUS CASCARILLA BARK.

Cortex Cascarillæ spurius consists, according to Holl, of quilled pieces, of about the thickness of the finger. It is yellowish-grey outside, with longitudinal, but no transverse cracks, and is frequently covered with a lichen resembling *Verrucaria nitida.* Beneath the epidermis its colour is almost like that of the genuine bark, but its surface is rougher. The internal surface is deeper greyish-brown, and the fracture less smooth. On examining a transverse section by a glass, fine dark-brown glittering lines, marked with white serpentine-like strokes, are seen passing from the interior edge towards the epidermis ; the exterior lighter substance is, however, not strongly marked. In the genuine, the fine lines are much less distinct, and the exterior substance is distinctly separated from the interior by a greyish-white stripe. The taste is similar to that of the genuine, but more disagreeably aromatic. Most reagents have the same effect as on the genuine, only a solution of sugar of lead produced, with the spurious cascarilla, a dark-brown precipitate, and with the genuine a brownish-yellow. There is no doubt but that the spurious bark belongs to a kind of Croton.—*Pharmaceutisches Central Blatt.*

TEST FOR ANHYDROUS ALCOHOL.

BY CASORIA.

In order to determine whether alcohol contains water, let a sample of it stand for some time in a well-closed vessel with anhydrous sulphate of copper. If water be present, the latter assumes a blue colour; but it remains white if the alcohol be free from water.

ON A PRACTICAL METHOD OF EVAPORATING LIQUIDS.

BY J. WEBER.

To exclude during continued evaporations the presence of dust from the vessels, and to accelerate the evaporation of the water, the author advises a pointed bag of thick linen, open at the top, to be fixed over the evaporating basins by means of a wooden frame, so that there be a space of a few inches left open between the frame and the brim of the basin. It is best to employ a separate bag for each basin, in order that if stirring be necessary, the latter may be removed, without exposing the other basins in the water-bath.—*Pharmaceutisches Central Blatt.*

PREPARATION OF OPODELDOC.

BY DÜNHAUPT.

In order to obtain pure opalescent opodeldoc, the author puts dry scraped soda-soap and camphor into a glass bottle, half filled with highly rectified spirit of wine. The bottle is placed in hot water, the cork now and then a little loosened, and the soap dissolved by shaking. The volatile oils and solution of caustic ammonia are then added, and the whole shaken until a cloudy mass precipitates, and the solution appears clear. This turbid matter effects, by shaking, the clarification in the same manner as the white of eggs. The solution is then quickly filtered through a piece of linen, which retains the cloudy fluid, and the well-closed vessel containing the filtered liquid is placed in hot water until the opodeldoc becomes as clear as wine, upon which the vessel is removed into very cold water, in order to cool the contents as speedily as possible.—*Pharmaceutisches Central Blatt.*

PRODUCTION OF NOBILI'S COLOURED RINGS, FROM ZINC, BY GALVANISM.

BY A. A. C. WALTER.

A cup having been filled with a concentrated solution of chloride of zinc, a platina wire from the zinc pole of a strong voltaic battery was dipped into it, and then a silver-plated copper disc, fastened to the platina wire of the copper pole, was introduced into it. Nobili's coloured rings appeared on the plated surface, which, however, soon became dim again. At the same time, foliaceous vegetations of glittering metallic zinc precipitated from the wire of the zinc pole, which soon extended to the copper-plate. The latter having been removed, and the wire of the copper plate again introduced, the vegetative formation of zinc soon lost its metallic appearance, and changed into a granular mass of a gray colour, which entirely dissolved after a short time. —*Central Blatt*, No. 14, 1847.

ON THE EXISTENCE OF AN ESSENTIAL OIL CAUSING THE PECULIAR SMELL OF STARCHES.

BY M. PAYEN.

Some years ago I thought I had sufficiently demonstrated the existence in starch of an essential oil, *sui generis*, possessed of a strong odour, having proved that pure alcohol takes it up, and becomes charged with the oil possessing the characteristic odour.

But it is difficult to procure alcohol free from all traces of volatile oils, and it is necessary to employ such large quantities of it for effecting the extraction indicated, that serious objections might have been raised against the conclusions drawn from my experiments. In fact, most Chemists, after expressing doubts on this point, have in preference adopted a contrary opinion, attributing to alcoholic fermentation the power of producing this and many other oils. Liebig, one of those who have adopted this theory in the most exclusive manner, further supposes that the presence of a fibrinous putrescent matter, contained in the pulp of the potato, is necessary to induce the peculiar fermentation capable of producing this essential oil, for, he adds, if instead of fermenting the boiled tubers, the starch be converted into sugar by means of sulphuric acid, the formation of the essential oil will no longer take place.

This was directly opposed to my views. Already on one point the theory of Liebig was controverted by M. Dubrunfaut, who had obtained the essential oil by distilling the products of potato-sugar, made with sulphuric acid ; but not wishing to discuss this point without further evidence, I waited the completion of my experiments, in the hopes of removing the objections which had been advanced against them.

I have recently had occasion to renew my researches, following the method which I have employed for the extraction of the aromatic essence of coffee.

In the application of this method, I chose the particular case mentioned by Liebig in support of his theory.

In appealing to facts as the means of deciding between us, thus taking the ground which my opponent has pointed out, the proof of the case ought to be conclusive ; it will, in fact, afford a further example to show how delusive in general are theories established without facts to support them, or which are founded on imperfect experiments.

According to Liebig's notion, the separation of the starch, and its conversion into sugar by means of acid, prevents the formation of oil in consequence of the elimination of the peculiar azotized ferment. My researches show that the oil pre-exists in the concentric layers of the grains of starch. The acid sets it at liberty, so that the vapour of water carries it away in part during the ebullition. If this be the case, a condensing apparatus attached to a close vessel, in which the saccharification by means of acid is conducted, ought to enable us to collect an oily product, obtained, according to its boiling point, either before or after the aqueous condensation.

If the opinion of Liebig be correct, the essential oil ought not to be obtained under these circumstances, or at least should be in very minute quantities.

The following are the results of two carefully-conducted experiments on this subject :—

Ninety-five ounces of water, acidulated with five thousandths of its weight of sulphuric acid, was introduced into a flask capable of holding ten and a half pints ; this was heated to the boiling-point, and then one pound one ounce and a half, *avoirdupois*, of potato-starch, mixed with water, was introduced by means of a tube funnel. The condensation of

the distilled products was effected fractionally. The two first products consisted of about sixteen ounces of liquid ; into the third refrigerator only a few drachms of liquid passed towards the end of the operation, and but a few drops into the fourth, which was surrounded by ice.

On dismounting the apparatus, a liquid having the odour of starch was found in the two first receivers, covered with a pellicle of whitish flakes, which, collected by dissolving them in æther, left, on the evaporation of the æther, a fatty substance, which, on cooling, became concrete but soft.

The third receiver contained about twenty drachms of an opalescent water, having a strong smell of starch, and covered with a yellowish oily liquid of the same peculiar smell, but much stronger.

The last receiver contained the two products in oily drops on its inner surface.

On uniting the two last products, I obtained by decantation rather more than a grain (eight centigrammes) of a fluid yellowish essential oil, possessing in a high degree the peculiar smell of the starch. Its vapour has a higher tension than that of water, but its boiling point is no doubt lower.

The aqueous liquid decanted from these products, gave about the fourth of the same oil.

The starch, therefore, contains at least the 0.0001th (ten thousandth) of its weight of fluid oil, besides the concrete oily matter, which is less volatile than water.

The quantity of essential oil, or its derivatives, which gives to wine its peculiar aroma, has been estimated at a forty thousandth, that is, one-fourth the quantity contained in starch.

Thus all doubt on this question is removed, for the experiment is direct, easy of repetition, and conclusive. This point, on which no positive opinion has been given in one of the most recent chemical works, is definitively settled. We may predict from it the solution of a great number of important questions still disputed.

It may be easily determined, not only that the starches derived from different sources, such as the potato, batatas, sago, and the cereales, owe their peculiar flavour, whether agreeable or otherwise, to pre-existing oils, but it may also be possible to ascertain the influence produced by these oils, or their modifications under the influence of air and ferments, in the development of the *bouquet* of wines, and the aroma of brandies.—*Comptes Rendus.*

ROYAL INSTITUTION.

USE OF A STEAM JET IN VENTILATION.

On Friday evening, June 11th, Professor Faraday delivered a lecture on the motive-power communicated by a steam jet to the surrounding air, and the adaptation of this principle to ventilation. The late Dr. Young, in his Lectures on Natural Philosophy, had explained the effects produced on forcing any visible vapour through a tube having a small aperture at the end. If the vapour be propelled with very slight force it will pass on, after escaping from the tube, maintaining a cylindrical form, to a considerable distance, but ultimately expanding into a cone ; if the force be increased, the conical expansion will commence

nearer to the orifice of the tube ; and if great force be applied, the vapour will assume the conical form immediately on issuing. It was found that this conical expansion of a jet of vapour was occasioned by the surrounding air being drawn into the propelled current and mechanically mixed up with it, and that the quantity of air thus drawn in was in proportion to the velocity of the current. The way in which this effect is produced was very clearly explained by Professor Faraday. "The jet of vapour," he said, "may be represented as consisting of a series of rings issuing from the mouth of the tube, and these, while they move onwards, have, at the same time, a revolving movement caused by the friction of the tube at the moment of their issuing." This was very beautifully illustrated by causing bubbles of phosphuretted hydrogen, disengaged from a mixture of phosphorus, lime, and water in a small retort, to issue from the beak of the retort immersed under water ; each of the bubbles of gas, as they rose out of the water in slow succession, ignited and formed a ring of smoke, which rose into the air, revolving in the manner described. It is to this motion in the particles of vapour or steam, when issuing from an aperture under pressure, that the effect, already noticed, on the surrounding air, has been ascribed. The effect was illustrated by discharging a jet of high-pressure steam from an opening the one-sixteenth of an inch in diameter, in the centre of an iron tube or chimney about nine or ten inches in diameter, when a strong current of air was determined through the chimney.

Professor Faraday had explained, in a previous lecture, that this method of causing a current of air through a chimney or shaft, had been successfully applied by Mr. Barry in the ventilation of the new House of Lords.

It was stated that a patent had been taken out for the application of this principle to ventilating purposes by a Mr. Bell, the patent applying only to the construction of a particular kind of tube, in which the steam jet was discharged. The patentee considered that the greatest effect was produced when the mouth of the outer tube or chimney was of the same diameter as the cone of steam which issued there. If the chimney be too small, the steam, coming in contact with the sides, would be partly repelled backwards, or if, on the other hand, it be too large, a portion of the power would be lost, in consequence of the air being drawn in at both ends of the chimney. A variety of experiments were performed to prove the force of the current thus created, and to show that this was due to the circumstance of a great quantity of air being drawn into the jet of steam. The fact, which has long been observed, and frequently but imperfectly explained, that the hand may with impunity be put into a

jet of high pressure steam, within a few inches of the aperture from which it issues from the highly-heated boiler, the jet itself being only slightly warm, was at the same time explained, the mixed air being sufficient, almost immediately, to reduce the temperature of the steam.

We think this mode of ventilation might be advantageously applied to pharmaceutical laboratories, or other apartments in which the occasional accumulation of steam with variations of temperature cause a difficulty in ensuring a regular upward current by ordinary means. In such cases, when a steam-boiler is at hand, a small jet directed into a shaft or chimney of suitable dimensions, would probably produce the desired result with a small expenditure of steam.

THE ROYAL COLLEGE OF CHEMISTRY.

At the Annual Meeting of the Royal College of Chemistry, which was held on the 7th of June, the Council announced that the class in the laboratory consisted of thirty-eight students, and that the total number since the opening of the College, was 147.

The laboratories are now completed, and afford to the student every facility for researches in all departments of Chemistry. Care has been taken to secure efficient ventilation on the most approved principles, and thus to obviate the injurious effects of the noxious vapours to which a chemical laboratory is liable.

We are glad to hear from the report of Professor Hoffman, that some interesting researches have been conducted in the laboratory, and that several of the students are at present engaged in investigations from which useful results may be anticipated. The institution, if well conducted and adequately supported by the public, is likely to be the means of introducing improvements in agriculture, manufactures, and the arts, by promoting the general advancement of chemical science, and affording facilities for research, as well as a stimulus to industry.

But in this as in other infant institutions, some difficulty exists in obtaining sufficient funds to carry out the objects in view, and in the erection of the laboratories, a debt of £2500 has been incurred. Several very liberal donations have been received, and a disposition appears to prevail among some of the supporters of the College to vie with each other in these laudable exertions. We are informed that one gentleman has offered a donation of £100, on condition that nine others will follow the example. It was also stated in the Report, that a Member had invested £1000 to be given to any student of the College who would, within five years, discover a method of preventing iron from rusting; and if not discovered within that period, the amount is to be given in

premiums of not less than £50 each, for other discoveries of minor importance.

It is by liberality of this description that the College of Chemistry may be expected to overcome the preliminary obstacles attending its establishment; and when the aristocracy and other wealthy members of the community have placed the institution on a firm basis, free from debt or incumbrance, subscriptions from the public at large will not be wanting. Support at the present time is of the greatest importance, and although the objects of the College have no specific reference to the Pharmaceutical Chemist, we should be glad to see it encouraged by those members of our body who possess the means of contributing towards the advancement of abstract chemical science.

During the past year the constitution and laws of the College of Chemistry have been settled and published. The regulations are not very voluminous, but appear to be sufficiently complete for present purposes, and can be enlarged or modified as occasion may require.

At a General Meeting of the Chemists and Druggists of Bristol and Clifton, held on the 10th of June, 1847, Mr. Giles in the Chair, the Chairman said—

Gentlemen,—This Meeting has been called in order that the feeling of the Chemists and Druggists of this city may be expressed in reference to the formation of a Society, to be called "*The Bristol Chemists' Association*," having for its objects the better education of their body, more especially the younger and rising members of the profession, which will be chiefly promoted by the delivery of lectures and the probable future formation of a School of Pharmacy, if, as is likely, the proposals for compelling the education of Chemists and Druggists throughout the kingdom become law. Thus, as in the case of the Provincial Medical Schools, the course of study would be completed near home, and it would be only necessary for the pupils to present themselves for examination in London to receive the necessary certificate of qualification.

A second feature of this Society would be the occasional meeting of its members for the reading of papers upon subjects connected with the science of Pharmacy, and mutual discussion thereon. Upon such occasions members will have the privilege of introducing friends, and it is hoped that to their assistants will be afforded the opportunity of participating in the advantages to be derived. By these meetings a friendly feeling will be established among the members, tending to extinguish all other than that honourable competition which may exist without diminution of mutual respect.

Societies of this kind commonly exercise an influence in the regulation of prices; but in the present case, doubts have been entertained whether such a course would be practicable. It is believed, however, that a good effect will be *indirectly* produced even in this respect,

without absolute interference on the Society's part; since it is well known that a class of people make it their business to go from shop to shop endeavouring to depreciate prices, by quoting one establishment against another, &c. &c. The occasional meetings of the members, where the accuracy of these statements could be questioned, would afford the best check to these practices, which very frequently have no foundation in truth.

In proof of the favourable regard with which the faculty view this forward movement, it is only necessary to allude to the liberal offer of Dr. Staples, who has volunteered to deliver gratuitously a course of Thirty Lectures upon Materia Medica, and it is earnestly hoped that the Chemists and Druggists throughout the city will testify their appreciation of his kindness by a large attendance. The tickets will be distributed at the charge of five shillings for the course, to defray incidental expenses, and care has been taken to arrange the hours so as to interfere as little as possible with business occupations. The attention of the meeting having now been directed to the principal purposes of the proposed Society, resolutions will be submitted to your consideration, which, according as they meet with your approval or dissent, will be ratified or rejected.

It was *moved by* Mr. FERRIS, *seconded by* Mr. MARTIN, and carried unanimously—

"That this Address be printed and circulated."

Moved by Mr. COOPER, *seconded by* Mr. HALE, and carried unanimonsly—

"That a Society (to be called *The Bristol Chemists' Association*) be formed of the Chemists and Druggists of Bristol and its neighbourhood, Members and Non-members of the Pharmaceutical Society, having for its objects the better education of their body and the general improvement and advancement of the interests of the trade."

Moved by Mr. SANDERS, *seconded by* Mr. DOWELL, and carried unanimously—

"That this Association do consist of Members, Chemists and Druggists in business on their own account, who shall subscribe five shillings annually (payable in advance) the receipt for which to be considered the test of membership.

Moved by Mr. BARGE, *seconded by* Mr. PEARSE, and carried unanimously—

"That the affairs of the Association be conducted by a Council, to be elected annually by the Members, which Council shall consist of President, Vice-President (who shall also act as Treasurer), Secretary and Seven Members. Three to be considered a quorum, and three to retire annually, but to be eligible for re-election."

Moved by Mr. BARGE, *seconded by* Mr. WATSON, and carried unanimously—

"That the following Members be authorized to act as the Council, and be empowered to elect from among themselves the President and Vice-President:

Mr. GILES	Mr. MARTIN	Mr. SANDERS
— SCHACHT	— HALE	— MAHON
— COOPER	— FERRIS	— ALLEN

Moved by Mr. MARTIN, *seconded by* Mr. FENDICK, and carried unanimously—

"That Mr. HARTLAND be requested to fill the office of Secretary to the Society."

Moved by Mr. ALLEN, *seconded by* Mr. HALE, and carried unanimously—

"That the Thanks of this Society are due to Dr. Staples for his very kind and liberal offer of a gratuitous course of Lectures on Materia Medica; and that the Secretary of the Meeting do forward him a notice of this resolution."

Moved by Mr. KEATT, *seconded by* Mr. COOPER, and carried unanimously—

"That the Thanks of this Society are due to Mr. THWAITES, for kindly offering the accommodation of his room for the purposes of the lectures."

Moved by Mr. W. GILES, *seconded by* Mr. COOPER, and carried unanimously—

"That a notice of this Meeting be forwarded to Mr. JACOB BELL."

Moved by Mr. FERRIS, *seconded by* Mr. COOPER, and carried unanimously,

"That the Thanks of the Meeting are due to the Chairman for his able and efficient conduct in the Chair, and the cordiality he has so materially assisted in promoting among its Members."

The Chairman returned thanks, and dissolved the meeting.

The Council continued sitting.

Moved by Mr. GILES, *seconded by* Mr. SCHACHT, and carried unanimously,

"That Mr. FERRIS be elected President."

Moved by Mr. MARTIN, *seconded by* Mr. COOPER, and carried unanimously,

"That Mr. GILES be elected Vice-President and Treasurer."

Moved by Mr. COOPER, *seconded by* Mr. SANDERS, and carried,

"That the Secretary do endeavour by the next meeting of the Council, to collect all claims upon the late Bristol branch of the PHARMACEUTICAL SOCIETY."

The Meeting of the Council was then adjourned to Wednesday evening, at half-past Eight.

THE ARTIFICES OF QUACKS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—As it adds materially to the usefulness of your journal to report occasionally systems of fraud which come under our notice, I send you the following, which is but one of several instances of which I am cognizant:

A few days ago, a respectably-dressed woman came into my shop, and requested to be served with two two-shilling and ninepenny bottles of Dr. Borthwick's Gout Tincture, at the same time placing in my hands the accompanying circular. I replied that I had not the medicine by me; but that I could procure it for her, from the address mentioned in the bill. She accordingly promised to call in the evening for it, when I acquainted her

that it was always customary, in cases of this nature, to leave a deposit, especially when the parties were strangers to each other; to which she made no objection, but placing a shilling on the counter, asked if that was sufficient, to which I replied in the affirmative. She then left, with an injunction that the bottles should be ready when she called in the evening. It struck me, from the eager manner of the person, and the curious style in which the circular was composed, that it was but a trick to get the medicine into my hands. I consequently instructed my assistant to watch where the woman proceeded. He soon returned, and said that she had entered the very place where the nostrum was prepared! I then very clearly discovered that she was herself connected with the preparation, and had resorted to this expedient to enhance its sale.

The woman certainly returned according to promise, she knowing very well that the medicine was not fetched from the establishment, and that she would doubtless get the shilling again. I at once accused her of the attempted fraud, threatened to retain the shilling for my trouble, and said that I should expose the party through the medium of the press. She answered me nothing, but instantly decamped.

On a further inquiry, I found that the preparation was one of the numerous empirical nostrums that are being continually thrust upon us, and that the circumstances, as detailed by the circular, are only such as would be used by a needy and daring adventurer. Should this, if inserted, have the effect of putting the members of our body on their guard against the like, I shall consider that I have but performed my duty in exposing this disreputable system. I am, Sir, respectfully yours,

JOHN ROWNTREE.

1, *Copenhagen Street, West,*
Hemingford Terrace, June 19, 1847.

The following is an extract from the hand-bill.

"At a Meeting held on Wednesday last, by several gentlemen who have experienced the highly beneficial effects of my Gout Tincture, I beg leave to inform you, that an unanimous opinion prevailed, that the extension or administration of this medicine to those of the poorer classes who may be labouring under the sufferings of Gout and Rheumatism, would be attended with the greatest benefit; and as I have been requested by the Meeting to give publicity to its views, I have taken the liberty of transmiting to you, in the form of a circular, these opinions, and which may be considered as a preliminary step towards the adoption of an Institution, that it is their aim ultimately to establish.

"I have the honour to be your most obedient servant,

"D. BORTHWICK.

"14, *Lower Queen's Row, Pentonville Hill.*
20th April, 1845.

"In bottles, 2*s.* 9*d.* and 4*s.* 6*d.* each."

"RESOLUTIONS,

"We, the undersigned, having experienced the beneficial effects of Borthwick's Gout Tincture, most of us having used it for six and seven years, can recommend it to those who are afflicted with gout, as a safe and speedy cure. This invaluable medicine instantly relieves the pain, and removes the most severe attack in two or three days, carrying along with it the excellent quality of strengthening the constitution; and what is most extraordinary, continuing to have the same effect upon us as when we first used it—a circumstance that is perhaps unparalleled, and which merits the high encomium bestowed upon it by Lord Francis Egerton, M.P., who has said (in a letter to James Loch, Esq., M.P.) that it is the greatest discovery in

the annals of medicine, mercury and bark not excepted. And as we are anxious to extend the benefit of this medicine to the poor, afflicted with this disease, knowing, as we do, the great increase of it amongst the more humble classes, we feel deeply impressed with the necessity of the humane and wealthy joining us in the laudable undertaking, whereby a fund might be raised to establish, upon a permanent footing, an institution, so as our views may be carried into effect.

"First resolution, proposed and unanimously agreed to—'That the sum of £1 1*s.* be subscribed, which will entitle each subscriber to seven tickets, to be distributed to the necessitous poor, afflicted with gout, rheumatism, and sciatica. And that these tickets may be available immediately, it is proposed that Mr. Borthwick shall furnish the medicine to those afflicted, who are in possession of them, whereby many advantages in the mean time will be gained."

"Second resolution, unanimously agreed to—'That Mr. Alexander Purvis, of No. 4, North Audley Street, be appointed Treasurer, and empowered to receive subscriptions and donations.'"

LETTER FROM MR. SWINFEN.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It is somewhat uncertain when the numbers of the *Pharmaceutical Journal* reach me. This circumstance will, I fear, prevent an answer to a letter, published in the journal from Mr. Redfern, of Ashby-de-la-Zouch, appearing in the forthcoming number.

Mr. R. complains that I returned no answer to his note, true—it was written in that imperative tone which induced me to decline any correspondence. His letter in the journal contains some palpable inaccuracies. I had no other object in calling at his shop than to purchase some medicine for the use of my family, and wanting to refer to the Pharmacopœia, I asked to see one. I again assert that Mr. Redfern distinctly stated, that he had no Pharmacopœia, and put into my hands a Conspectus.

In my letter to you, written to make other enquiry, I accidentally noticed the circumstance as an instance of the necessity of legislative interference to enforce dispensers of medicine to keep in their possession a College Pharmacopœia. I did not send the letter for publication ; but it appears you thought it would be useful, and therefore it was much at your service.

If Mr. Redfern is aggrieved by the exposure, his own intemperate zeal has inflicted upon himself the pain. Had he been silent, and calmly looked at my letter, he would have seen not the remotest personal reference —there are other Druggists in Ashby, and yet he alone takes up the gauntlet. The reason is obvious, and your readers can only come to one conclusion—that he has unwittingly sought his own conviction. "*Qui capit, ille fecit.*"

To you, Sir, and the Council, the qualified Chemists and Druggists owe a lasting debt of gratitude, and I trust you will soon see your exertions crowned with success. Then shall we see the rising generation of Chemists aspiring to fame, and honourably emulating each other in the promotion of science.

The age is passing away when the assumption of a name, without qualification, will satisfy public inquisition.

I am, Sir, your obedient servant,

W. B. Swinfen.

Whitwick, June 21*st*, 1847.

[We regret that a misunderstanding has arisen between our two Correspondents, and hope the controversy will proceed no further.—Ed.]

PROPOSED PLAN FOR INCREASING THE BENEVOLENT FUND.

Sir,—In the Report of the Council of the Pharmaceutical Society, read at the last Annual Meeting, the attention of Members is directed to the amount of subscriptions, &c., received during the past year on account of the Benevolent Fund, as also to the fact that the reduction in the terms of subscription precludes the possibility of appropriating any portion of the current income of the Society to that purpose, and the Council express the hope that the Members in general will exert themselves on behalf of the Fund. This is also ably advocated by the Society's respected President, and also by Messrs. Tosswill and Herring; but the only remedy that I see in your Report, is that suggested and repeated by the latter gentleman.

Now, Sir, I would respectfully submit that this remedy may very probably succeed with the more opulent Members of the Society, but would not be available to all, as I am well aware there is a class, and that not a small one, who could, and I think would, contribute to the Benevolent Fund, who would not like to take a guinea ticket for a dinner.

So that if I might be allowed to suggest a sort of supplementary remedy, I should say that something like the following might be advantageously effected, without in the least interfering with the benevolence of our richer friends.

The Report states that we number in our Society 1625 Members and 1311 Associates and Registered Apprentices; now, if each Member would subscribe *2s. 6d.*, and each Associate and Apprentice *1s.* per annum, a sum amounting to about £270 would be produced, and I think, poor as many of us are, it would be cheerfully given.

Perhaps some might think the subscription small, and derogatory to the Society or themselves; but such means are not unfrequently had recourse to for benevolent purposes, and I do not see any reason why something of the kind might not be legitimate in the drug trade; and besides, if any one would feel himself demeaned by being asked for so small a sum, he can easily, and without fear of offending, present a larger one. Thousands of pounds, Sir, have been raised in pence, and why not in half-crowns? Again, to save the expense of a paid agent to collect such small sums, let a few Members in various parts of town, have subscription books; and, if need be, call on all in their neighbourhood: a list of the Members might be furnished by the Secretary, who is never behind-hand when the cause of the Society requires his services, as was evidenced in the case of the petitions to Parliament; or let an advertisement or notice be inserted in the journal, stating where subscription books are opened for the purpose, and I feel persuaded many will be ready. I will beg, in conclusion, to offer my own humble services, if they may be of use in either case.

I am, Sir, yours very respectfully,

John F. Blandford.

97, *Charlotte Street, Fitzroy Square,*
June 10, 1847.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—In the Report of the Council upon the present Anniversary of the Pharmaceutical Society, it appears the Subscriptions to the Benevolent Fund are by no means so satisfactory as could be desired, or the importance of the object would be supposed to command; the great question is, what are the best means to be adopted for increasing the subscriptions, and in such a manner that they shall become annual and permanent.

Now it appears to me that, as this Fund is created for the special benefit of those of the Members who may unfortunately hereafter require its assistance, and as every Member of the Society is more or less subject to such a

contingency, it is but right that every one belonging thereto should do his part by becoming an annual contributor; and I think it by no means a difficult matter to carry out such an object. What I would recommend is, that the sum of 5*s.* should be added to the Annual Subscriptions of the London Members, 3*s.* to that of the Country Members, and 1*s.* 6*d.* to the subscriptions of the Associates, for the sole purposes of the Benevolent Fund. These sums are individually insignificant, and would be thought little of, and yet collectively they would produce about £350 even in the present state of the Society; and as we have every hope and prospect of progressing in numbers as well as importance, the progressive increase of the subscriptions would of course be in the same ratio. This plan would not (or at least ought not to) interfere with the present sources of support that the Fund receives, but will be an independent subscription, uninfluenced by, and uninfluencing any other. I think I have stated sufficient to explain my views upon the subject, and if you consider the proposition worthy of notice, I have little doubt it may be carried out without difficulty, and I hope without dissatisfaction to any Member of the Society.

I am, dear Sir, yours obediently,

Bromley, June 19th, 1847. J. R. SHILLCOCK.

We have received a pamphtet (pp. 83), by William Baly, M.D., on *The Pathology and Treatment of Dysentery;* also a medicine chest dispensatory, entitled *The Physician in Emergency* (pp. 81), by Mr. John Dutton, Birkenhead.

TO CORRESPONDENTS.

A. B. (1.) inquires how to make a zinc tree. We presume he means a lead tree, which is made by suspending a piece of metallic zinc in a solution of ℥ss of acetate of lead in ℥viij of distilled water.—(2.) *Camphor tablets* are made by melting camphor and white wax together, and scenting the mixture.

"*Quinine.*"—We cannot give a better formula. Pure quina, precipitated by ammonia from the sulphate, should be used.

"*A Southampton Druggist.*"—Some confusion exists in reference to the concentrated decoctions, essences, or fluid extracts of sarsaparilla. When these are ordered in prescriptions, the Chemist can only judge of the strength intended by the dose, which, for an adult, would usually be about ℥iv of the ordinary decoction.

"*An Original Subscriber.*"—Most Chemical Professors undertake analyses.

T. T. (*Ramsey.*)—The diving apparatus with the helmet may be seen at the Polytechnic Institution in Regent-street, where information may be had on the subject.

W. B., A.P.S.—For the bleaching of shellac, see vol. vi., No. 4, p. 188, of this Journal.

A.P.S.—With reference to the stamp duty, it makes no difference whether the recommendation be on the label or on the paper of directions describing the remedy.

X.—A Chemist keeping a two-gallon still for the distillation of water only, is not liable to the tax.

Mr. Joseph Almond (*Devonport*).—We answered the letter by post, and the answer has been returned. *N.B.* This occurrence is not unfrequent, and may account for the authors of some communications receiving no reply. Associates should always state the name of the Chemist with whom they reside, or the name and number of the street.

J. B. D. should write to the editor of the *Veterinarian.*

A.B.C., *M.P.S.*, and *T.G.S.*—The communications have been received.

We are requested to draw attention to an Advertisement, on the advertising sheet of this Journal, from the Committee of the "Chemists and Druggists Early Closing Association." The Committee have reason to adopt the motto "Save us from our friends."

G.H.W. (*Maidstone.*)—A solution of shellac in spirit of wine.

T.T. (*Pimlico.*)—When decoctum cinchonæ is ordered in a prescription, we should use yellow bark, unless either of the other two varieties were ordered.

"*Alpha.*"—(1.) Alum is used for diminishing the combustibility of a variety of substances, such as ropes, muslins, &c.—(2.) Silver is soluble in nitric acid, precipitated from this solution, as a chloride, on the addition of hydrochloric acid, and the chloride is soluble in ammonia, and precipitated again by nitric acid.—(3.) We have heard it recommended to shake mixtures containing hydrocyanic acid each time a dose is taken. We are not prepared to state that this is requisite.—(4.) The quality of milk is judged of by the quantity of cream which it yields.

E. D. G.—A Chemist in business on his own account cannot be an Associate of the Society. Members who secede, may be re-admitted on the payment of arrears and a small fine.

We have received several letters respecting the proposed Pharmaceutical Bill, containing a variety of hypothetical cases, and inquiring how the said Bill would affect them. In the present stage of the proceeding, it is scarcely necessary to enter into all these details, but we conceive that no difficulty would arise in the several cases alluded to. We have preserved for future reference all the letters received on the subject of the Bill.

T. E. S.—We appreciate the communication, but think the articles alluded to are unworthy of notice.

"*Honestus.*"—(1). We have not met with any copy of the London Pharmacopœia in which Tincture of Cubebs is ordered to be made with proof spirit.—(2). We have frequently alluded to the inconvenience arising from arbitrary changes in the nomenclature and strength of officinal preparations. The publication of a national Pharmacopœia would undoubtedly be a great advantage.

D. H., *M.P.S.*—Apprentices registered in 1847, enjoy the same privileges as those registered before the date of the Charter, with the additional advantage of passing the minor examination on becoming Associates, which will give them a higher standing in the profession.

Mr. Levison.—We beg to acknowledge the receipt of the article entitled "Injurious Effects of the Inhalation of Ether," by James H. Pickford, M.D. We think it is too early to arrive at so positive an opinion on the subject.

W.H.D. (*Hastings.*)—See vol. v., pp. 288 and 384.

M.P.S. (*Exeter.*)—Extractum aconiti made from the dried plant cannot, of course, be substituted for that made according to the Pharmacopœia.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if answers be desired in the ensuing number).

Bills sent for insertion as Advertisements should be 8vo, the same size as the Journal, otherwise they look awkward, like the one in this number.

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. II.—AUGUST 1st, 1847.

PHARMACEUTICAL EDUCATION, AND ITS PROSPECTIVE INFLUENCE.

It is a curious fact, that while the truth of the axiom that "Knowledge is power" is self-evident, the majority of the community, when left at liberty to make their election, prefer ignorance. This inconsistency not only prevails among the young and inexperienced, but even parents, who ought to know better, are too often induced to ruin the prospects of their children for the sake of saving a few pounds in their education. An apprentice-fee is paid as a matter of course,—the system of apprenticeship having been established by custom and sanctioned by law; but the fond parent having paid this fee of 100 guineas and upwards, to secure to his hopeful son an initiation into the "art and mystery of the trade," which in some instances is found to be little more than the cleaning of bottles, counters, and windows, with other mechanical drudgery of the shop, recoils at the idea of giving a few extra guineas for the privilege of attending lectures, or obtaining practical experience in a scientific laboratory.

So remarkable an indifference in a matter which seriously affects the character and prospects of the rising generation of Chemists and Druggists, may be attributed to the fact that the business has hitherto been considered merely as a trade, requiring about the same amount of mental cultivation as the trade of a grocer, an oilman, or a dealer in marine stores.

This delusion cannot continue to prevail much longer, and in proportion as the number of qualified Chemists increases, the importance of education will become manifest: those young men who neglect the opportunities of improvement within their reach, will find themselves eclipsed by their less short-sighted competitors, and will be thrown into the shade. The eyes of parents will be opened, and in calculating the expense of bringing up a son as a Chemist, the apprentice-fee will no longer be the only consideration. Those whose means will not admit of the requisite expenditure, will naturally turn their attention to some other occupation more suited to their position, while a superior class of persons will be induced to embark in Pharmacy on account of the increased respectability which improved education will confer on the body at large.

Thus the influence of the School of Pharmacy is not confined to the limited number of pupils who have the good sense to avail themselves of its advantages. Its grand object is the establishment of a principle which must sooner or later become general in its application. The fact that a specific education is absolutely necessary, in order to insure the qualification of Pharmaceutical Chemists, has been demonstrated in a most satisfactory manner by the result of the School of Pharmacy. The superior attainments of those students who have presented themselves for examination have been noticed from time to time in the Annual Reports of the Council, and we are glad to observe that this improvement is progressive. Although the examination is more stringent than it was in the first instance, the candidates are evidently better prepared for it, and pass with greater facility. Stronger evidence could not be adduced in favour of the system of education adopted, and in proof of the efficiency with which it has been carried out. In order to establish the *necessity* for such a system, we need only compare the qualification of the students of the school with that of candidates who have not enjoyed this advantage; but we are anxious to dwell on the bright side of the picture, and therefore avoid enlarging on this subject.

While so favourable a result has attended the establishment of a School of Pharmacy, as a means of raising the qualification of students, it is to be regretted that the number who have hitherto availed themselves of it is so small, and that consequently the expenditure considerably exceeds the amount received in fees from the students. At the same time we beg to remind our readers that the school was not founded as a pecuniary speculation. It was not expected to realize a profit, or even to pay its expenses. The scale of fees was fixed at a rate which could not possibly attain this object, even if the classes had been as well filled as they ought to have been. The existence of such an institution was an innovation—an inroad on the accustomed prejudices of a body of tradesmen who had been accustomed to estimate every advantage, whether moral, social, or political, by pounds, shillings, and pence; and we were, from the beginning, quite prepared for the inquiry, "How much shall we gain by it?" It would be difficult to convince a child that by learning his A, B, C, he is acquiring the means of obtaining a subsistence; but it ought not to be difficult to convince a Chemist that by obtaining a knowledge of his profession he is deriving a similar advantage, and the School of Pharmacy was intended as a means of practically demonstrating the fact.

But the question arises—how can a School of Pharmacy in London benefit those who reside at a distance and cannot take advantage of it? The answer is plain:—the whole body of Chemists in this country are injured, and their professional charac-

ter undermined, by the inroads of persons who commence the business without possessing any education. The only remedy for this evil is the recognition by law of a Pharmaceutical qualification, and the protection of those who are qualified. The only method of securing this result consists in providing the means of obtaining the requisite qualification, for which purpose a School of Pharmacy is indispensable.

If the Chemists at large think proper to recognise this principle, and carry it into effect, they may essentially benefit themselves as a body, at the same time that they confer an equal benefit on the public. If they are so blind to their own interest, and indifferent to their professional credit as to disregard the education on which their character depends, then it is the duty of the Government to exercise a parental authority, and enforce a Pharmaceutical education in the same manner as a parent obliges a child to learn his A, B, C.

It is obvious that without the assistance of the legislature, the introduction of a general system of education will be a tedious process, for while all desire the passing of a law which shall confer on qualified Chemists that rank and position which they ought to enjoy, the majority cannot be induced, without this stimulus, to speculate on the maxim that "Knowledge is power," but rather cling to the more palatable doctrine—

"Where ignorance is bliss, 'tis folly to be wise."

When an act is passed, and when it is generally understood that no person can in future enter the business and enjoy the rank of a Chemist without passing an examination, students will not be wanting, and not only will the School of Pharmacy in Bloomsbury Square be numerously attended, but other schools of a similar description will in all probability be established to supply the demand for Pharmaceutical education. In the mean time, we need only persevere in our straightforward course, regardless of the expenditure of a few hundred pounds in the attainment of so important an object. If these efforts should not be attended with that success which we anticipate, much responsibility will rest on the Government, whose duty it is to second the endeavours of individuals in the introduction of public improvements of a sanatory nature.

THE PRIVILEGE OF IGNORANCE.

We not unfrequently receive communications from apprentices, inquiring whether they can be admitted into the Pharmaceutical Society with the privilege enjoyed by those who joined before the date of the Charter. The privilege alluded to is exemption from examination ; and as a general answer to such inquiries, we propose to explain the nature of this privilege. In establishing a society, the object of which was to introduce an examination for all Chemists and Druggists, it was necessary, as well as expedient, in the first instance, to make some exceptions. It would have been an act of injustice to oblige those who had been for some time in business to come forward and test their qualifications before a Board of Examiners, whose verdict should decide whether the candidates were competent to conduct the business in which they had already a vested interest. Even if this had been attempted it could not have been enforced, as the whole trade would have risen up in opposition. It was therefore necessary and expedient to exempt from examination all those who were already in business, allowing them a limited time to join the Society as original members.

A similar indulgence was due to those who were acting as assistants, who had entered the business without any expectation that an examination would be instituted, and who had passed their apprenticeship on the old system.

But it was also urged on behalf of apprentices, that many of them were nearly out of their time, and almost in the position of assistants—that others had entered the trade without having had any warning either in reference to preliminary education or the probability of an examination in Pharmacy, and that, consequently, apprentices should be exempted in the same manner as assistants.

Accordingly, during the period allotted for the admission of *original* members, associates, and apprentices, no examination was enforced, and by this means a nucleus was formed, consisting of more than three thousand persons, all of whom had obtained a footing in the trade, and who might fairly consider it a privilege as well as a right to be exempted from an ordeal which was not contemplated at the time that they embarked in the business.

When the Charter of Incorporation was obtained, there were still a considerable number of very respectable Chemists, who, from various causes, had not joined the Society, and it was thought right to give the Council a discretionary power to elect such parties as members without examination, and a provision to this effect was introduced into the Charter. But it was not thought right to extend this provision to assistants and apprentices. Ample time had been allowed for those to whom an examination would

have been a hardship to obtain admission without this trial, and some young men had already prepared themselves for the examination by private study, under the creditable idea that they would by this means gain a higher position. The original intention was, therefore, adhered to in the case of associates and apprentices, and the Charter provides that no persons shall be admitted as such without examination.

Six years have now elapsed since the Society was established. The apprentices have become assistants—many of the assistants have commenced business on their own account—the present race of apprentices has embarked in the business, forewarned of the fact that the Chemists are endeavouring to keep pace with the times, and that some test of qualification will be expected. Yet we still hear a desire expressed to avoid the examination. To the apprentices of the present day this would be no privilege, nor can it be claimed as a right. Whatever claim exists now will exist at the expiration of another six years, and if this be admitted, we may ask, when is the improved system to come into general operation?

Those who have employed their time properly during their apprenticeship need not fear the examination, and will have no reason to regret the exertion they have made in acquiring the requisite knowledge—a possession the value of which they will appreciate in after life.

UNJUST ATTACK UPON A CHEMIST.

We should not have felt called upon to offer any comments on the late inquest at Putney, nor even to report it so much in detail, if we had not seen in the *Lancet* of July 24th, some reflections on Mr. Farmer, which we consider to be very unjust. There is obviously nothing in the evidence which reflects any discredit on Mr. Farmer. Application was made to him for a dose of medicine for what was supposed, by all the parties concerned, to be a slight bilious attack, and he gave the most simple and rational remedy—four grains of grey powder, and a mild aperient draught. This not proving sufficiently active, he was applied to for a stronger dose, but prudently sent a draught no stronger than the former one, adding to the powder three grains of Dover's powder, on account of the sickness. Any person having a private medicine-chest might have done the same.

The writer of the article in the *Lancet* arguing on *ex post facto* information, says, that "with impending ulceration of the intestine, two purges of senna and salts were much the same as putting a razor into the hand of a suicide," and designates the transaction as "on the part of the Druggist, pure gambling with disease, the life of another party hanging on the issue."

We contend that the information given to Mr. Farmer, furnished no reason whatever for suspecting the existence of any disorder beyond a slight disturbance of the alimentary canal; in fact, it was the kind of information generally given when a mild aperient is required. If, therefore, Mr. Farmer did wrong in furnishing the medicine, it is wrong for a Chemist to furnish aperient medicine under any circumstances, and it would follow that the sale of medicine to the public by retail, is "gambling with disease."

Ten thousand persons may take a mild aperient, and derive benefit, but if one of these persons happen to be at the time labouring under the early stage of a fatal malady, the blame is attributed to the vendor of the medicine, and a principle is laid down which implies equal blame on the vendors of the 9,999 doses which proved beneficial. If each of these persons had sent for a physician, ten thousand guineas would have been paid to the profession, while only one patient required medical advice.

But how stands the case with the medical* practitioner. On his first visit he sent an aperient, although this was not administered or mentioned in evidence. He then administered opium, and subsequently a teaspoonful of brandy, with three or four glasses of wine. His assistant made a mistake in directing the box of pills—we hope he did not make another mistake in the quantity of opium. At all events the patient shortly afterwards became comotose, as if narcotized by opium, and Dr. Cormack, besides administering two emetics, each consisting of a scruple of sulphate of zinc, which produced no effect, "used every exertion to rouse her by sinapisms, hot water and mustard to the feet, &c." The meaning of the word *et cetera* was not explained at the inquest—namely, slapping the bare legs and body of the patient violently, pinching and dragging her about the room, bawling into her ears, irritating the nose and fauces with feathers for upwards of four hours, until death ensued.

The jury in their verdict pronounced the treatment of Dr. Cormack to be "skilful, judicious, and proper, and such as a medical gentleman with an adequate knowledge of his profession would have adopted."—(for "CONGESTION OF THE BRAIN†," with "impending ULCERATION OF THE INTESTINE," "well known to medical men as a dangerous complication of CONTINUED FEVER").

In this verdict the writer in the *Lancet* fully concurs ! ! !

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* Dr. Cormack keeps a dispensing establishment in Putney, and undertakes to give medical advice for the sum of One Shilling !

† See report of the Inquest, page 91.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected July, 1847.

MEMBERS.

Bicester . . .	Sandiland, Robert Burgess, Market End
Bingham . . .	Ely, George, Market Place
Bristol	Hodder, Henry, St. Michael's Crescent
	Jolliffe, James E. H. Durdham Down
Carlisle . . .	Thompson, Andrew, 17, English Street
Cheltenham . .	Beetham, Michael, 381, High Street
	Palmer, Faithful, Montpellier Avenue
Chester	Bowers, James Done, 101, Eastgate Street
Gravesend. . .	Strawson, Henry, 1, Harmer Street
King's Lynn . .	Wigg, John Goddard, *omitted* 1842
Manchester . .	Barnes, John, Temple Street
	Reddish, John, Shude Hill
	Ritson, John, 162, Great Jackson Street
Newark . . .	Cooling, John, Castle Gate
Nottingham . .	Harrison, John, Bridlesmith Gate
	Harrison, Thomas, 6, Wheeler Gate
	Palethorpe, Samuel, Carrington Street
Usworth . . .	Southern, Samuel
Yeadon	Tetley, John

MAJOR EXAMINATIONS.

Down, John L. H.	Torpoint
Farmer, James.	Castle Donnington

MINOR EXAMINATION.

Swann, William Henry . . .	London

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Cox, Edwin	Mr. Kershaw . .	Ormskirk
Fitze, James Rogers . .	Mr. Groves . .	Blandford
Hives, Tom Gamble . .	Mr. Caparn . .	Newark
Hornsby, Thomas . . .	Mr. Caparn . .	Newark
Mumford, George . . .	Mr. Ede . . .	Dorking
Pearson, James	Mr. Hedderley .	Nottingham
Wilson, James Lodge . .	Mr. Cheetham .	Nottingham
Wride, Francis Blake . .	Mr. Barge. . .	Bristol

ORIGINAL AND EXTRACTED ARTICLES.

ON THE CANNA ACHIRA, OR TOUS LES MOIS.

WITH A SPECIMEN OF RECENT TUBER.

BY W. HAMILTON, M.B.

In a letter from my friend, Edward Watts, Esq., British Consul at Carthagena, in South America, of the date of the 19th of July, 1825, he informed me that

"My Chocó correspondent promises to send me two curious productions of that province. The one is called *El Clavellino*, or *Palo de Sangre*, the blood wood, which is a powerful styptic: the other is called El Achira: the plant and flower resemble so perfectly the *Indian Shot* plant (*Canna Indica*) as to be often taken for it; but it contains no pod bearing the black globulæ seeds of the former. When the plant begins to wither and decay the root of it is mature, and proves a fine esculent substance, equal, if not superior, to the *Arracacha root*."

The first of the productions named in this extract, proved to be a species of the genus *Brownea*, of which many are to be found in the Cordillera of the northern coast of South America, from Punta Paria in the east, to the Gulph of Darien in the west, as remarkable for the beauty of their flowers, which has obtained for them the general name of *Rosa del monte*, as for the economical and medicinal uses of their timber, which hardly yields, in point of beauty, to the celebrated rosewood, now so extensively employed for ornamental furniture.

But it was the second, under the name of El Achira, which particularly attracted my attention, although it was not till after the lapse of fourteen years that I succeeded, most unexpectedly, in obtaining tubers of what I strongly suspect to be identical with the plant spoken of by Mr. Watts, which, from his description is undoubtedly a Canna, although from the circumstance of its multiplying so readily by the root, its seeds came probably so rarely to perfection, as to create an opinion among the ignorant inhabitants of the province that, as Mr. Watts observes, although resembling the *Indian Shoot* in every other respect, it differed from it in the absence of the accustomed seed vessel and its enclosed black and spherical globules. Mr. Watts, indeed, some time after, sent me seeds as those of the Achira, but which, on being sown by Mr. Pontey here, proved to be those of the Canna coccinea, from which I have at present every reason to believe the Canna, producing the esculent roots of the Chocó, to be specifically distinct. The roots of the Canna coccinea are neither tuberous like those of the *Tous les Mois*, nor fusiform, like those of the Maranta or Janipha—but fibrous; a character which certainly does not correspond with the account, however

vague, which Mr. Watts was enabled to procure of the Achira of the nearly unknown district of the Chocó.

In this state matters slumbered till 1839, when I unexpectedly received a box containing several pounds of the farina, accompanied by some tubers of the plant since known by the name of *Tous les Mois*, but with which I was till then wholly unacquainted, from Mr. Olpherts, one of the special magistrates sent to St. Kitts, who has since, as I learned with sincere regret, fallen a victim to his noble exertions in the cause of science and philanthropy, leaving a widow and five infant orphans to lament their irretrievable loss. Mr. Olpherts, in the letter which accompanied his munificent and unexpected present, communicated the following particulars, which cannot fail to be read with interest, coming as they do, almost from the silence and oblivion of the tomb:—

"I must acquaint you that *I first introduced this farina* (*Tous les Mois*) to the notice of the British public. When I arrived here in 1834, the plant was cultivated in the gardens of a few negroes, resident on a property belonging to the Earl of Romney, and, having been told that the farina made from it was much superior to the arrow-root (*Maranta arundinacea*) I purchased some, and found it as reported. I procured a few plants, and having prepared a sample with care, presented it to Dr. Waterson (since dead), at that time the cleverest man of his profession in the island, for his opinion and report, which, having obtained, I sent it home to Drs. Ryan and James Johnson, with specimens of the farina for trial and report. A reference to Dr. Ryan's *Medical and Surgical Journal*, for August, 1836, and to Dr. Johnson's *Medico-Chirurgical Review* for October of the same year, will furnish you with the opinions of these three gentlemen on the subject. The botanical name *Canna coccinea*, was given to the plant by Dr. Sadler, the only person then in the island, at all conversant with botany. I think the term indefinite, and shall be glad of your opinion on the point. As a food for infants, whose mothers are deficient in nature's proper aliment, and for the dyspeptic, it is invaluable. It never ferments on weak stomachs, and is highly nutritious. I spent a good deal of money in my endeavours to make it a marketable commodity. I have encouraged the cultivation of it among the negro population, and have given plants to all who applied for them; and in the parish in which I reside, there is scarcely a peasant's garden unadorned with this beautiful plant. I have sent plants to Bermuda, by the Rev. Thomas Jefferies, Wesleyan Missionary. If you have not seen the plant, you will be delighted with the beauty of its appearance. Its usual height is about *four feet*; but, with attentive culture I have had them *sixteen feet high*, and the size of the tuber increased in proportion. *The return, in suitable soils, is immense.* It loves *a rich loam, with a southern or western aspect*; and, when it has taken root, it *almost defies the weather.* The flower is of a rich vermilion hue."

Such was the interesting account communicated by this worthy and lamented labourer in the little cultivated field of West Indian philanthropy.

Soon after the receipt of the tubers and farina of the *Tous les Mois* sent to me by Mr. Olpherts from St. Kitts, I was favoured with a second box of the farina, sent also from St. Kitts by Richard Edward Cardin, Esq., of that island, through his Lon-

don Agents, Messrs. Hankeys, Plummer, and Wilson, whose letter of the 21st of March, 1839, is now before me, and furnished the following additional particulars :—

"TOUS LES MOIS."

"A preparation from the roots of the *Canna coccinea*, or *Flowering reed*, a native of St. Kitts and other tropical climates, a most nutritious and easily digestive diet, containing less acid than any other farinaceous food, never turning sour on the stomach, or tending to astringency, is very superior for invalids or children to sago, tapioca, arrow-root, or gruel, stated to be a most valuable article, mixing like arrow-root, but six times more nutritious, &c. &c. Boiling liquid poured on two or three teaspoonfuls (previously liquefied cold), will instantly convert it into the quantity of a large breakfast cup of firm jelly, and which will remain so when cold, unlike arrow-root, which deposits. Boiled and in admixture with other materials it may be used in very many ways beneficially for the sick or others."

Such are the facts connected with the history of this valuable plant which are in my possession, but I have strong grounds for questioning the accuracy of some of them, especially the statement made by Mr. Cardin's agents, "that it is an indigenous production of St. Kitts and other tropical regions." From the French name given to the farina of the tubers, it is sufficiently obvious, that whether they be the native produce of St. Kitts, or not, the method of preparing the farina, and its application to the purposes of food, were borrowed from the French planters of Gaudeloupe, Dominica, or Martinique; and that the mistake of assigning it a West India *habitat* arose from the error committed by Dr. Sadler, of confounding it, without sufficient examination, with the C. coccinea, which not only differs from it in the most essential feature, that of not yielding an esculent tuberous root, as has been already observed, but in other points to be noticed presently.

The Canna coccinea was cultivated by Mr. Philip Miller in this country as far back as the year 1734, and is described in the first edition of his Dictionary under the name of *Cannacorus*, 4. It was included by Wildenow in the 4th edition of his *Species Plantarum*, published in 1797, or fifty years ago; described by Roscoe, in the eighth volume of the *Transactions of the Linnean Society*, page 338, forty-nine years since; figured still more recently in the 454th plate of the *Botanical Magazine*, and included in the first volume of the second edition of Aiton's *Hortus Kewenis*, published in 1810, or thirty-seven years ago. Thus we see that the plant has been familiar to British botanists and known in British collections for more than a century; but during the whole of this long period we do not find the slightest intimation, either from cultivaters at home or the inhabitants of those regions in which it grows spontaneously, of its roots being esculent, or manifesting, under any circumstances, a disposition

to enlargement, or to deviate from the fibrous character which is characteristic of the greater part of the known species; although we can hardly suppose that, in its wild and uncultivated state, its growth was invariably restricted to localities unfavourable to the development of tubers.

But there remains yet another point of difference between the two plants which, in the absence of better botanical evidence, should not be overlooked—the freedom or reluctance with which the inflorescence is developed.

The Canna coccinea flowers in this country with the same freedom as the Canna indica—and is possibly as capable of cultivation in the open border during the continuance of our summer heats. The plants raised by Mr. Pontey from the tubers received from Mr. Olpherts in 1839, could not be induced to flower by any means within his knowledge and power, and hence, shortly after supplying the root which Mr. Young has successfully established in Barbados*, the remaining roots were, I believe, thrown away as worthless. But while the plants thus raised directly from the tubers obstinately resisted every ordinary method of compelling the inflorescence to develope itself, those raised from the seed erroneously sent to me by Mr. Watts as that of El Achira, and of which I sent a portion to Jamaica, flowered without difficulty in both places, and proved, as both Dr. Bancroft's information, and a personal examination of the flower satisfied me, that they were no other than the Canna coccinea so long and so well known, and prized *solely* on account of its blossoms.

I am, therefore, strongly inclined to believe that the plant, whose tubers yield the *Tous les Mois*, is the native of a hotter climate than the Antilles, that it will be found, when an opportunity has been afforded of examination of the fructification, to be specifically distinct from all the non-esculent Cannæ, and more nearly related to the C. tuberosa, from which it differs however in its shyness of flowering; its native locality must be sought in the hot and humid regions of the Chocò, and will most probably be found to be identical with the Achira spoken of by Mr. Watts in his letter of the 19th of July, 1825. Assuming this to be the case, I some years since named it provisionally Canna Achira, a name which was adopted by the late Mr. Loudon—and should my conjecture prove correct, on a better acquaintance, I should suggest separating the non-esculent from the esculent-rooted Cannæ, by forming the latter into a distinct genus, under the name of Achira; of which the Canna tuberosa and the C. Achira may be constituted the types, under the names of Achira tube-

* Barba*dos*, and not Barba*does*, is the correct orthography.

rosa and Achira vera—as has been already done with the genus Jatropha, from which the Janiphæ have been judiciously removed.

The root now sent has been recently received from Mr. B. T. Young, of Barbados, to whom the parent plant was furnished a few years since by Mr. Pontey. I hope every effort will be made by those to whom its culture may be intrusted to compel the development of its flowers, by all the effective appliances of modern science, and thus enable us to clear up the mysterious cloud which yet overhangs it.

11, *Octagon, Plymouth, 2d July*, 1847.

CHLORIDE OF ZINC,

AS AN ANTISEPTIC, PRESERVATIVE, AND DISINFECTING AGENT.

Numerous inquires having been made lately for chloride of zinc, to be used as an antiseptic and disinfectant, the following information on the subject will probably be acceptable to many of our readers:—

In the year 1840, Sir William Burnett, director-general of the medical department of the navy, took out a patent for the application of chloride of zinc in preserving animal and vegetable substances from decay. In the specification, the patentee states that the invention consisted in preserving woollen and other fibrous animal and vegetable substances by impregnating them with a solution of chloride of zinc. The solution is made by dissolving one pound of chloride of zinc in five gallons of water, and the substance to be preserved is immersed in this solution for a period varying from forty-eight to ninety-six hours, according to its density, and afterwards dried under cover.

Since the time at which the patent was granted, we believe a pretty extensive trial has been made of the solution of chloride of zinc for the purposes specified. From some persons who have thus used it, we have heard favourable reports, while others represent it as inferior to some of the other preservative agents in use.

But no mention is made in the patent, of the use of the solution as a disinfectant: its application for this purpose appears to have been an after-thought. Yet it is in consequence of its recommendation as a disinfecting and purifying agent, that it now forms the subject of so many inquiries.

The following circular has been addressed by the Secretary of the Poor Law Commissioners, to the Boards of Guardians throughout England and Wales:—

"*Poor-Law Commission Office, Somerset House, 6th July,* 1847.

"Sir,—I am directed by the Poor Law Commissioners to state that they have received from the Secretary of State for the Home Department a copy of a Report from the Surgeon of Her Majesty's Ship '*Vengeance*' to the Director General of the Medical Department of the Navy, together with other papers, on the subject of the salutary effect of Chloride of Zinc, when used as a disinfecting agent."

"In consequence of the prevalence of fever at present in some parts of the country, it appears very desirable that the properties of this article, as described in the papers in question, should be made generally known. The Commissioners, therefore, in accordance with the suggestions of the Secretary of State, transmit herewith for the information of the Guardians, copies of the papers referred to, and they request that the Guardians will draw the attention of their medical officers to the same, with the view to the use of Chloride of Zinc being adopted under their direction in fever wards, and other parts of the workhouses, and in the dwellings of pauper patients attacked by fever, and that the Guardians will for this purpose provide such a supply of the article as may be necessary.

"The Commissioners are informed that it may be procured at the office of the Proprietors of the Patent, No. 53, King William Street, London Bridge.

"The Commissioners request that in any case in which Chloride of Zinc is used, they may receive from time to time reports as to its efficacy.

"I am, Sir, your most obedient servant,

"W. G. Lumley, *Assistant Secretary.*

"*To the Clerk of the Board of Guardians.*"

This circular is accompanied by the following instructions for using the solution, which are headed "Sir William Burnett's Patent," &c. :

"DISSECTING ROOM.

"Immerse the subject in a solution made in the proportion of one pint of the patent solution with five gallons of water. Let it remain about two hours in the dilute solution ; after which time it will be purified. As the dissection proceeds, the parts should be sponged over with the same.

"HOSPITALS, POOR-LAW UNION HOUSES, &c. &c.

"For the purpose of purifying the atmosphere, add one pint of the patent solution to five gallons of water. With this dilute fluid, moisten a piece of flannel-cloth attached to a long rod, and wave it through the air of the apartment for ten minutes at a time—in addition to which, the floor should be mopped or sprinkled over with the same at least once a day. In fever wards, when a patient dies of fever, the body should be sponged over with the dilute solution, and the clothes and bedding should be immersed and kept in the same (in a spacious tub) for forty-eight hours, before being washed. The floor should be well mopped over with the solution. Flannel moistened with it as before recommended, should be waved through the room, and a small quantity of the same dilute solution should be put into the close-stools and bed-pans. The water-closets should also be cleansed with it, and a couple of gallons occasionally thrown down each. This being carefully attended to in all hospitals, union-workhouses, prisons, &c. &c., will most effectually prevent the emission of any noxious smell from cess-pools, &c.

"FOR THE PURIFICATION OF BILGE-WATER, &c., ON BOARD SHIPS.

"The patent solution should be mixed with water in the proportion of one pint of the former to two gallons and a half of the latter. It should be well stirred with a clean stick, and it will be ready for use in a few minutes. The quantity to be used at a time is twenty gallons for each hundred tons of the ship's measurement.

"It should be poured into the air-holes of the ship, so that it may find its way by the limber-holes into the well; and it should be thrown by a small engine, into places where it may be inconvenient to introduce it by other means. A portion may also be poured down the ship's pumps, the boxes being previously removed to allow of its free passage below.

"The solution should be allowed to remain in the ship twenty-four hours. At the expiration of that time, the ship should be pumped as dry as possible, the well thoroughly cleansed and washed with the solution, and the operation repeated as occasion may require.

Now the question here presents itself: What is the evidence on which the Government have been induced to direct the attention of the Poor Law Commissioners, and the Commissioners to call the attention of the Guardians in all the unions and parishes to the use of chloride of zinc as a disinfecting agent?

It would be expected that the evidence adduced, under such circumstances, would be that of perfectly disinterested persons. But what are the facts of the case? A Surgeon in the navy, holding his appointment under Sir William Burnett, writes to the latter that he has found the solution of chloride of zinc a valuable disinfectant on board H.M.S. *Vengeance*, whilst employed in the conveyance of troops; and Sir W. Burnett, no doubt anxious to promote the sale of his patented solution, writes as follows to the Government:—

"*Admiralty*, 22*d June*, 1847.

"SIR,—I had the honour some time ago to call your attention to the salutary and extraordinary effect produced by the use of the Chloride of Zinc as a disinfecting agent, and also its singular and beneficial properties in immediately on its application destroying and decomposing the noxious smells arising from the putrefaction of animal and vegetable substances, and also its instant destruction of the smell of bilge water arising in the holds of ships. I now beg leave to solicit your attention to the copy of a letter herewith enclosed from the Surgeon of Her Majesty's Ship '*Vengeance*,' just returned to Portsmouth, after carrying large bodies of troops; and at a period like the present, when contagious fever is spreading far and wide in Ireland and in some of our own towns from the immigration of the destitute Irish, I cannot but think that its use would be attended with the greatest advantage, and add most materially to the preservation of life and the subduing of the contagion or infection.

"Having, as you will easily suppose, paid more than common attention to the case of the unfortunate '*Eclair*,' I have no hesitation in saying that it was by the use of the chloride of zinc in that ship that the fever was finally overcome.

"The chloride has been in general use in the Navy for more than a year.

"I have, &c.

"W. BURNETT, M.D.,

"*Director General Medical Department.*"

"*Right Hon. Sir George Grey.*"

We are not disposed to deny the value of the solution of chloride of zinc as a purifying and disinfecting agent, although at present the only evidence we possess on the subject is derived from the parties interested; but we take exception to the manner in which it has been brought thus prominently into notice, which appears very much like an official job.

We object, especially, to the ingenious wording of the recommendation from the Poor Law Commissioners, coupled with the instructions for using the chloride of zinc, which are calculated to give an erroneous impression. From the latter it might be inferred that the preparation of chloride of zinc for use as a disinfecting and purifying agent has been secured by patent to Sir William Burnett; while, in the former, the public are directed to the patentee's office, for the purchase of an article which any Chemist may make and sell for the above purposes.

We have obtained some of the chloride of zinc from the office, No. 53, King William Street, and find it to be a dense liquid, having double the density of water, and containing twenty-five grains of zinc in every fluid drachm. In using it, one pint is mixed with five gallons of water.

M. LEDOYEN'S DISINFECTING FLUID.

Several months ago our attention was directed to a fluid represented to possess the property of destroying the offensive effluvia of cesspools, drains, sick-rooms, &c., and preventing the spread of contagious diseases. M. Ledoyen, who was introduced to us as the discoverer, stated that this fluid possessed all the efficacy usually attributed to chloride of lime, as a disinfectant, without the disadvantage of causing the evolution of any deleterious compound, and that night-soil or other refuse might, by means of this fluid, be entirely deprived of its noxious odour, at the same time that its properties as a manure were rather improved than deteriorated. It was also described as being a certain specific against contagion, and an inexpensive compound, easily procurable.

It was the object of M. Ledoyen to introduce this disinfecting fluid to the notice of the profession and the public, in which we readily consented to assist, provided he would furnish such information as might enable us to publish a statement suitable for a scientific journal. But in answer to this proposition, it was alleged that, by divulging the secret in this manner, the pecuniary advantage to which the discoverer considered himself entitled might be lost, and while he offered to submit the liquid to experiment before any tribunal, he declined to give any information as to its composition, or to afford the opportunity of analysis. We therefore expressed our regret that it was not in our power to assist in the matter, as we could not with propriety be concerned in puffing a secret nostrum.

M. Ledoyen, however, in conjunction with Colonel Calvert succeeded in introducing the fluid to the notice of the Government, a parliamentary inquiry ensued, and a report was published. During the whole of these proceedings the secret was kept so inviolate that none of the fluid could be obtained except on a promise that it should not be chemically examined, and we could not even obtain it from the Fever Hospital, where it had been in use for many weeks, because we declined to take the pledge. A small quantity, however, was recently furnished from another source without the pledge.

It is now generally known that the fluid is a solution of nitrate of lead, which like other salts of lead decomposes sulphuretted hydrogen and hydrosulphate of ammonia, thus destroying the smell and producing innoxious compounds. That the salts of lead possess this property is known to every student in Chemistry, and these salts are familiar to the profession as applications in the form of lotion and for other purposes.* We have known Mr. Ure prescribe a solution of nitrate of lead as a lotion for foul ulcers two or three years ago.

It therefore requires no further proof to establish the fact, that the salts of lead are adapted as decomposing agents for neutralizing animal or vegetable effluvia in which sulphuretted hydrogen is the active ingredient. But it remains to be proved that the fluid in question is a specific against the miasma of fever which, in the opinion of some of our best chemical and medical authorities, is distinct from sulphuretted hydrogen, although generally a concomitant.

On the supposition that sulphuretted hydrogen is the cause of fever, it might be expected that the students in a chemical laboratory, where the air is constantly contaminated with this gas, would be particularly liable to febrile attacks. This, however, is not found to be the case. The subject is one which deserves every attention which can be given to it, and affords scope for a most important philosophical inquiry.

It appears that M. Ledoyen does not contemplate securing to himself by patent the exclusive right to sell his fluid; but claims from the Government such reward as may appear on investigation to be due to him, as the discoverer of a disinfecting agent of great importance to the health and welfare of mankind. A similar application was made to the French government, but the grant was refused.

Some of the facts elicited by the parliamentary investigation are interesting, and we propose to publish extracts from the official report in our next number.

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* M. Le Maitre, another French Chemist, claims the merit of suggesting the use of nitrate of lead as a disinfectant.

SECRET LINIMENT FOR FEVER.

A short time ago a person obtained the ear of the Government in reference to a liniment (consisting chiefly of oil of origanum) which was said to be a specific against fever, and he was sent officially to the Fever Hospital to try it on some of the patients. One patient was rubbed with the liniment several times. The pulse rose from 120 to 140, and no amendment took place. Several others were made the subject of experiment, until the ward became quite offensive from the smell of oil of origanum; but no benefit was found to arise from the application. When the circumstance was reported to the Committee by one of the medical staff, orders were given that no quackery with secret nostrums should be allowed in the hospital.

While we stigmatise proceedings of this description as quackery, we must not be understood to call in question the propriety of rewarding in a proper manner the discoverers of any remedy or fact calculated to prove essentially useful to the public. But when we see the Government tampering with secret nostrums, and patronising mysterious specifics, we are forcibly reminded of Joanna Stephens's cure for the gravel and stone, the formula for which was purchased by a former Government for £5000: the money being paid before the secret was divulged. The boasted remedy was found to consist of snails boiled in a particular manner with a few common herbs.

The author of any discovery may make his election as to the manner in which he will receive remuneration, according to the circumstances of the case, and the position he desires to hold in reference to it. Persons who sell their nostrums as specifics, like Morison's pills, or Holloway's ointment, may puff them in the usual way by handbills and advertisements, and rank with Morison or Holloway as quacks. A man who publishes his discovery to the world, gains as his primary reward scientific reputation, and may obtain pecuniary remuneration also, without detracting from his professional character. It is, however, notorious, that the former class of persons often realize fortunes, while the latter obtain a comparatively small pecuniary return, or sometimes none at all, for their exertions. It should be the province of the Government to maintain the equilibrium of justice in such cases, so far as may be found practicable; and we are glad to observe that this policy is gaining ground, pensions as well as other rewards having within the last few years, been afforded to scientific and literary men, in cases where their circumstances or public justice appeared to demand such encouragement.

ON A CHLOROMETRIC PROCESS FOR THE VALUATION OF BLEACHING POWDER.

BY F. GRACE CALVERT, ESQ.

(*Read before the Philosophical Society of Manchester.*)

The process to which I beg to call your attention is not entirely new, being Gay Lussac's method by arsenious acid, which I have transformed from the French system into the English, and, I hope, made it sufficiently simple to be employed by bleachers, or other persons not accustomed to much chemical manipulation.

It was the knowledge, proficiency, and precision required under Guy Lusac's method, which prevented the great majority of bleachers, even in France, from adopting it.

Let us throw a glance at the different methods which have been employed to test bleaching liquors. The first one was called *Berthollimetre*, from the celebrated Chemist, who was the discoverer of it, although it was first published in 1794 by a person of the name of Decroizilles. It was based on the power possessed by chlorine to destroy the colour of indigo. His standard liquors were made with one part of indigo dissolved in nine parts of sulphuric acid, and the whole diluted with 990 parts of water.

In 1824, Gay Lussac greatly improved upon the system of Decroizilles, and called the process for testing bleaching powders *Chlorometry*.

His attention was chiefly directed to improvements in the method of producing the standard liquor, and in introducing apparatus of a simple construction, which by their easy graduation and *handling* rendered the process sufficiently easy for the practice of bleachers.

Though this method is still employed by nearly all the bleachers on the Continent, it is subject to serious errors; for instance, from the deterioration which the standard indigo liquor undergoes in time, and which consists in its gradual loss of strength.

A second disadvantage, not less to be noticed, is a want of the knowledge of the exact time when the process is ended.

It was owing to these principal difficulties combined with some minor ones, that Gay Lussac was induced to search for some more accurate process, and after many years' trial he published, in 1835, three new standard liquors, which shall be noticed after our attention has been directed for a short time to the system generally followed in this country.*

"It is one in which the chlorine is determined, by finding what quantity of the chloride of lime to be analysed is required to convert a known weight of the *protoxide* of iron into *peroxide*. For this change protoxide of iron requires half an equivalent of oxygen, which is supplied in the present process by the decomposition of half an equivalent of water by the chlorine of the chloride of lime.

"Half an equivalent of chlorine, therefore, or 221.8 parts, effects this change upon a whole equivalent, or 439 parts of protoxide of iron, which quantity of protoxide is contained in one equivalent, or in 1728 parts of crystallized protosulphate of iron. Therefore, 221.8 parts of chlorine can peroxidize 1728 parts of crystallized protosulphate of iron

* See Graham's *Elements of Chemistry*, p. 502; and Parnell's *Elements of Chemical Analysis*, p. 221.

(or 10 grains of chlorine can peroxidize 78.1 grains of the crystallized protosulphate). Now the process consists in discovering how much of the specimen of chloride of lime is requisite to peroxidize 78.1 grains of the protosulphate, which quantity of the chloride must contain 10 grains of chlorine.

"In the first place, 78 grains of the pure protosulphate (clean crystals of the salt dried by strong pressure between folds of cloth) are dissolved in about two ounces of water, and the solution is acidulated by a few drops of hydrochloric or sulphuric acid. Fifty grains of the chloride of lime are weighed out, mixed well in a mortar with about two ounces of tepid water, and the mixture poured into an alkalimeter. The measure is filled up to O, with the washings of the mortar, and the liquids are well mixed by agitation, the mouth of the alkalimeter being closed by the palm of the hand. This solution of chloride of lime is then gradually added to the solution of 78 grains of protosulphate of iron, until the latter is completely peroxidized, which is discovered by means of the red prussiate of potash. This salt gives a precipitate of Prussian blue with a salt of the protoxide of iron only, and not with a salt of the peroxide; so long then as it produces a blue precipitate, protoxide of iron still exists in solution, and more chloride of lime must be added. In applying red prussiate as the test, it is convenient to have a plate spotted over with small drops of its solution, which are touched with a drop of the liquid to be tested, taken out on the point of a glass stirrer, stopping short exactly at that point at which the red prussiate of potash ceases to afford Prussian blue.

"The number of measures poured from the alkalimeter is carefully observed. The richer in chlorine the specimen of chloride of lime is, the less, of course, is required. As this amount, whatever it may be, but which, for example, we will suppose to be 70 measures, contains always 10 grains of chlorine, it becomes a simple matter to calculate the per centage of chlorine in the specimen."

This mode of operating offers some serious inconveniences, and is productive of error.

The first is, that it is very difficult to have pure sulphate of protoxide of iron, for it oxidizes with great facility; and unless in the hands of a Chemist, or one well acquainted with its nature, great errors may arise in employing it as a standard.

A second objection arises from the necessity of having the salt in a fit state of dryness, which is not easy to be ascertained by a commercial person; and lastly, the disadvantage of not being able to judge with promptness the exact point when the oxidation is complete.

This is why I would employ Gay Lussac's method, whose standard liquors can be kept a great length of time without undergoing any change; and further, because we are enabled readily to perceive the instant of saturation, either by natural or artificial light.

This system is founded on the readiness with which *arsenious acid* is converted into *arsenic acid*, under the influence of chlorine, which in decomposing water gives rise to hydrochloric acid, and the oxygen acting upon the arsenious acid transforms it into arsenic.

The plan pursued consists in dissolving arsenious acid in hydrochloric acid, and then diluting this acid with water until a given volume of chlorine, say a litre, will transform an equal volume of this solution of arsenious acid into arsenic.

Here lies the difficulty which prevents this method from being popularised, because it requires much experience in manipulation to get exactly a given volume of chlorine in an equal bulk of water, none but a Chemist, or those having much practice, could attain this object by Gay Lussac's method. One of his plans is to prepare a quart of chlorine, and to have it slowly dissolved in a weak solution of potash, which object is obtained by dipping the neck of the bottle in the alkaline liquor, withdrawing the cork and allowing the liquid to flow in slowly. This method requires time and two or three complicated calculations.

His second plan is to prepare a quart of chlorine with a pure peroxide of manganese, or a manganese whose quality is known. But here again a difficulty presents itself to persons engaged in business, and it is here where I hope that I have been enabled to introduce a real improvement, by simplifying it to such a degree as to render it easily practicable to any one.

My method is to take a solution of chlorine of an undetermined strength, of which I easily determine the quantity of chlorine dissolved by pouring in a given quantity, say one cubic inch of standard liquor, made of 10 grains of pure silver, dissolved in pure nitric acid, and then diluted with water, so as to occupy 1000 grains; consequently each hundred grains of solution contains one grain of silver. Now, by the quantity of solution employed to form with the chlorine, chloride of silver, I can very easily ascertain the quantity, in grains, of chlorine that my solution contains in a determined bulk.

This method is very accurate, for it is well known how great is the insolubility of the chloride of silver, and the sensibility of its re-action. Owing to the heavy weight of the chloride, the liquid is rapidly cleared, whereby it is easily ascertained when the action is completed. By having two or three tubes filled with chlorine, the value of the chlorine solution may be readily tested to a very great nicety. Knowing that 5.1 grains of chlorine will transform seven grains of arsenious acid into arsenic acid, a standard liquor may be made of arsenious acid which will exactly contain seven grains of arsenious acid in 1000 grains of water.

This method of making a standard liquor is only necessary when great precision is required; but for commercial purposes, when the determination of a bleaching liquor to half or one per cent of its real value, is quite sufficient, a standard liquor can be obtained by dissolving seventy grains of pure crystallized arsenious acid in one ounce of hydrochloric acid, and then diluting the whole with a sufficient quantity of water to give a total of 10,000 grains, consequently 1000 grains of distilled water will contain seven grains of arsenious acid, which will require 5.1 of chlorine to transform it into arsenic acid. This method of operating is very simple and easy, a fair sample may be taken from a cask from which fifty grains are weighed, to be well mixed with water in a mortar, and then poured into a 1000 grain measure, divided into one hundred divisions, or in other terms into an alkalimeter; the measure is then filled with the washings of the mortar up to the O of the instrument, so that each division will contain half a grain of chloride. If great accuracy is required, a given quantity of the liquid must be poured into a chlorimeter tube, which may indicate in tenths each division of the alkalimeter. On the other

hand, there must be put into a vessel, with rather a narrow mouth, 1,000 grains of the arsenious acid liquor, which contains seven grains of this acid, and which will indicate 5.1 of chlorine. This solution is coloured by a drop of sulphate of indigo, and whilst giving the liquor a revolving movement in the left hand, the chlorine mixture must be poured with the right.

When the blue colour becomes weak, a fresh quantity of blue must be added, and then proceed to add with great care the bleaching liquor, as the end of the operation is near, which point is indicated by the immediate disappearance of the blue colour.

To prevent the error of about from 1 to 2 thousandth, which the two drops of indigo may have introduced in the essay, a second operation is begun by pouring into a new portion of arsenious liquor, the quantity of chloride solution which is *nearly* requisite for the operation, and it is only *then* that the drop of blue sulphate of indigo is added. The number of measures employed is carefully observed. The richer in chlorine the specimen of chloride of lime proves, the less of course is required. To know the per centage which the number found indicates, the following method is adopted :—

Suppose that twenty-five divisions have been employed, which indicate 5.1 of chlorine, it must be calculated how many times the number of divisions employed will go in 100, namely, four times; then by multiplying 5.1 by 4, the result is 20.4 grains of chlorine, per cent. Should 20 divisions be used, 100÷20 gives 5 ; then 5.1 by 5 indicates 25.5 grains of chlorine per cent, and so on for any other number found.

In addition to the advantage of determining with ease the exact moment when the operation is at an end, this method affords, after a little practice, a very rapid mode of ascertaining the value of a bleaching liquor, and of being able to prepare a large bulk of standard liquor, which, by its non-deterioration, can be employed with safety for a long period, for by taking one thousand grains of it the value of a bleaching liquor can be determined in a short space of time.

M. Gay Lussac also proposed the employment for standard liquors of the yellow prussiate of potash, and the nitrate of mercury, transformed by a little chloride of sodium into protochloride ; but standards made with those substances are in time susceptible of undergoing changes, which might lead to errors, besides, like the protosulphate of iron, they do not present a rapid indication of the moment when the operation is completed.

OBSERVATIONS ON MR. JACKSON'S REMARKS ON SYRUP OF BARK.

BY M. DONOVAN, ESQ., M.R.I.A.,
Late Professor of Chemistry, &c., at Apothecaries' Hall, Dublin.

Not having been aware of Mr. Jackson's remarks* on my process for obtaining "a new and more efficient Preparation of Cinchona Bark,"† until a few days since, I hasten to make some observations on them, in order to show that my original communication did not lead

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* *Pharmaceutical Journal*, vol. iv. † Ibid.

to the serious errors which Mr. Jackson imputed to it. It is true that, in adding the numbers 170 and 87 together, I committed the oversight of making them amount to 157, instead of 257; an error which affected all the other calculations,‡ the practical result being that I represented the syrup to contain one-seventh of a grain of kinate of quinina more than it really does, in each dose of one drachm. This is indeed a very unimportant error: one that I was almost immediately informed of, by the learned Editor of this journal; it was easily made, as Mr. Jackson will allow, when he learns, that out of sixteen figures, constituting four of his corrected calculations, no less than nine of them are wrong.

He charges me with assuming extreme averages, laying down ill-founded propositions, and seriously misrepresenting the strength of the syrup. Now I will show that I do not deserve this castigation. I stated, that "IF a French pound (7559 grains, troy) of yellow bark furnish on an average 200 grains of disulphate of quinina," certain results specified, will follow. Mr. Jackson, assuming this conditional ratio as an invariable one, calls it in question, and opposes to it a statement made by an anonymous English manufacturer, "that 100 avoirdupois pounds of good yellow bark yield him sometimes 50, and sometimes only 25 ounces of sulphate of quinina; that is, from 31.25 to 15.6 parts in 1000, or from 23.4 to 10.7 of quina." The amount of disulphate of quinina from one French pound of bark, would therefore be 236.22 grains, and sometimes the half of that quantity or 118.11 grains. But the prudent manufacturer, in thus disclosing the extremes of his products, wisely said nothing of his *averages*. Mr. Jackson, however, settles the point by arithmetic, assumes the *mean* instead of the *average*, and affirms that I have adopted an extreme estimate. We must examine how far the assumption of the arithmetical mean (177.13 grains) agrees with the estimates of our best authorities.

I conceive that the French Codex is, on this subject, of the very highest authority: from it we learn that "the quantity of sulphate of quinina obtainable from 1000 parts of cinchona ought to be 29 to 30;" that is, one French pound should afford 227 to 219 grains, according to the quality of the bark: and it is to be remembered that amongst the compilers of the Codex were such men as MM. Pelletier and Caventou, the discoverers of this salt, along with Robiquet, Bussi, Soubeiran, and other eminent persons, who ought to be considered no mean judges of the matter.

Had Mr. Jackson consulted Dr. Thomson's Dispensatory, as well as Dr. Christison's, he would have found reason to believe that Michaelis estimates his product at 3.7 per cent. of quinina, that is 312.26 grains of the sulphate from a French pound of bark. Wittstock obtained so much as 227 grains. Professor Thomas Thomson, of Glasgow University, says, that "good yellow bark yields about one thirty-fourth part of its weight of sulphate of quinina, by Henri's process:" that is, a French pound will give 222 grains. Pelletier's turpentine process affords 211 grains. It is true that Von Santen got so little as 169 grains; and Pelletier and Caventou obtained, in their first trials 173 grains; but better methods have since returned larger products.

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‡ The arithmetical errors were all corrected in the *Dublin Medical Press*, where the Essay was reprinted.

Now all these are above the estimate of 200 grains assumed by me; and it is to be observed that I took no account of the kinate of cinchonia present in the bark, which is said to be an equally valuable febrifuge. It is further to be noted that the quantities above mentioned were actually *eliminated* from the bark in crystals—does any one doubt that more, perhaps much more, remained unextracted? Hence I conceive that my average of 200 grains was not only moderate, but probably much below the true one; and even had I assumed Mr. Jackson's mean, the difference would have had no practical effect on the syrup.

The next charge is that I have "simply stated" that yellow bark *ought* to contain 7 per cent. of kinate of quinina; in other words, that I have assumed so high an estimate without authority; and in refutation, Mr. Jackson adopting the opinion that the kinate of lime present in yellow bark is always proportional to the kinate of quinina, conceives that when the minimum quantity of the latter is present, the kinate of lime will be but 36.41 parts from 1000 of bark, or about one-half of the per centage assigned by me. On this relation of the two salts contained in cinchona, I make no comment, but confine myself to the statement of the following fact: Deschamps, the discoverer of kinate of lime in cinchona barks, who ought to be good authority, informs us that "after *rigid calculation*, he finds the quantity produced to be one ounce three gros for one pound of yellow bark employed:"§ that is 8.6 parts of kinate of lime from 100 of yellow bark: and he adds, with regard to the barks used by him, that "this result has never varied. He used twelve pounds of bark at a time; and we must suppose that much of the kinate of lime was left unextracted. I conceive, therefore, that I would have been warranted in having taken ten per cent. instead of seven, as an average product of this salt from the best yellow bark; Mr. Jackson's argument is therefore against a fact. The reader will judge, from all these calculations, whether my preliminary estimates merit these animadversions.

Mr. Jackson then endeavours to prove, *from my own results and calculations*, that I have over-estimated the ratio of the kinates of quinina and lime present in yellow bark; but as irrefragable testimony has been brought forward that this ratio is rather undervalued, I need say no more on this head than that he has misconceived the case. From a statement of Guérette's, to which I vaguely alluded without any mention of relative weight of bark, measure of water, or manipulation, Mr. Jackson infers that decoction of bark can *only* contain one-third of the kinate of quinina, which was present in the bark itself. Having accordingly assumed that when two ounces of bark are boiled in so large a quantity of water as thirty-two ounces, only eleven grains of kinate of quinina are dissolved, he makes me accountable for the want of agreement between his assumption and facts established by the best authorities. His conclusion, therefore, that I have represented yellow bark to contain a much greater quantity of kinates of quinina and lime than it does, amounts to a denial that Pelletier, Caventou, Robiquet, Bussi, Soubeiran, Wittstock, Michaelis, Deschamps, and others, obtained the results which they have announced. We have only to admit that the decoction has taken up 7.8 grains of kinate of quinina

§ *Annales de Chimie*, 48, p. 65, first series.

more than Mr. Jackson assumes, and the alleged discrepancy disappears. My comparative estimate of the syrup and decoction of bark, being avowedly founded on their taste, could not be understood as professing to aim at exactness; for having no means of ascertaining what quantity of quinine salts was really dissolved in bark decoction, I was obliged to abandon all my calculations. I found, as nearly as I could determine, that the syrup is thirty times stronger than the decoction; the former being diluted with water until of the same taste as the latter, which was also sweetened to the same degree as the former. Hence I inferred that one drachm of the syrup is equal to thirty drachms of the decoction. This is stated as a fact, founded on the only evidence of which the case was susceptible; but Mr. Jackson, without assigning any reason, or making any trial, declares that my thirty drachms should have been little more than half that quantity; yet the arithmetical errors which he discovered, have nothing to do with the subject, and therefore ought not to have guided him.

The only error worth noticing, into which I was led by miscalculation, was that in which one drachm of the syrup is stated to be equal to ninety-six grains of cinchona powder: it should have been 71.4 grains. Mr. Jackson also has miscalculated this.

Mr. Jackson says, that on heating the evaporated decoction and tincture with the quinina and oxalic acid, the quinina melts into a mass with the red cinchonic, which thus materially prevents its combination with the kinic acid. It is true I gave no precise directions for the manner of mixing the ingredients, and for some other manipulations, the skill of the operator must always obviate the necessity of tedious details. All I can say is, that a little consideration would have shown him how to avoid the inconvenience he has suffered; he would have discovered that nothing can be more easy than to dissolve the gum and quinina, and that the red cinchonic has no such influence as he supposes.

I shall not follow Mr. Jackson through all his arguments, from which he boldly concludes that the syrup is nothing but a solution of kinate of quinina. He makes his way fearlessly through difficult subjects on which our best authorities are much divided. On this part I shall only remark, that as he is not well founded in his conclusions, the arguments which led to them may be passed by.

Independently of all theoretical considerations, the practical fact of the solvent powers of sugar on the proximate principles of cinchona bark, noticed by Soubeiran, well known to me, and acted on in the French formula for syrup of bark, would prove that my syrup could not be a mere solution of kinate of quinina, as Mr. Jackson affirms it to be.

The syrup prepared by Mr. Jackson it appears was a thick gray mass clogged with lumps of gum and undissolved quinina. I can assure him that such a syrup is far from being the representative of what is so extensively used in Dublin, which is a brown, intensely bitter-and-sweet astringent syrup, having the peculiar taste of yellow bark in a very striking degree; affording the characteristic blackish-green colour with persalts of iron, and a copious precipitate with solution of isinglass. These are not the characters of solution of kinate of quinina, which is a merely bitter liquid, possessing neither colour, astringency, nor aroma.

As to the turbid appearance of this syrup, it may be on that account less attractive to the eye, but it is important to its medical efficacy. This blemish is removed in the French formula for syrup of bark by filtration through paper; but the commentators consider the clearing of it a deterioration: Bouchardat remarks that the cinchonine, red cinchonic, and starch are all removed by the filter. Barbier says that, although the syrup, from being clear, soon becomes muddy, it loses nothing of its powers. Guibourt makes a similar observation; but declares that dilution and filtration (a method to which Mr. Jackson had recourse) is injurious. In my process it would have been neither possible nor desirable to clear the syrup. Subsequent experience and new researches have suggested to me new improvements in its preparation; and to these and some new theoretical considerations, I expect in a short time to return.

11, *Clare Street, Dublin,*
July, 1847.

ON VANILLA AND ITS CULTURE.

BY DESVAUX.

The cultivation of vanilla requires a damp but warm climate and a good soil. Hence a ground with low shrubs, which give little shade, is best adapted. It is not necessary to till the ground in any way, but the slips of vanilla are planted at the root of a tree or shrub on the approach of the rainy season, when they creep up around the trunk. Once a year the plantation is cleared of the exuberant shrubs, and in the third year the plants bear fruit. The inhabitants of Misantla, twenty-four leagues north-west of Vera Cruz, are the only persons of the republic of Venezuela, engaged in the cultivation of this plant. They distinguish five sorts:

1. *La Corrienté*, of which there are two kinds: one with a delicate fine skin, rich in seeds and pulp, and the other of an inferior quality and with a thick skin; the *Lec*, *Ley*, or *Leg*, of some parts of South America, the genuine vanilla of commerce. Perhaps *Vanilla aromatica*, Sw.?

2. *La sylvestré*, or *Cimarrona* (wild vanilla); the fruit is smaller than the foregoing; it grows in the shade, or among the shrubs, its fruit therefore is less developed than that of the cultivated vanilla, with which it is identical. Some call it Simarona.

3. *Mestiza.* The unripe fruit is green, with brown spots; more cylindrical than the genuine, and easily dehiscing on becoming dry.

4. *La Puerca.* The fruit is much smaller than the first kind, and in the unripe state is dark green; when drying, it evolves an offensive smell, from which it is also called *hog vanilla* (*vanille de cochon*).

5. *La Pompona* (*v. pomponа*, Schiede). The fruit is shorter and thicker than No. 1, and has a very delicate epidermis. The smell is pleasant and is particularly obvious when becoming dry, but is not so agreeable as that of the first sort; in time it loses its smell, and hence is but little valued. This probably is *Bova thick vanilla* (*v. bouffie*) of some authors, and is known in France under the name of *Vanillon.*

The harvest begins about the month of December, and the yellowish-green colour of the fruit, which was formerly green, indicates its ripeness. Often, however, the fruits are gathered before they are ripe, partly by the proprietors, partly also by persons who like to reap what others have sown. The pedunculus is always left on the fruit. After the harvest the fruits are allowed to dry a little till the pedunculus loses its green colour, whereupon the dressing of the vanilla commences in the following manner:—Straw mats covered with woollen blankets are spread on the ground; when the latter are

well warmed through by the sun, the fruits are spread on them, so that they are equally exposed to the sun. Then they are wrapped in the blankets, placed in boxes, covered with clothes, and still further exposed to the sun. Within twelve hours they should have assumed a coffee-brown colour ; if this is not the case, the process is repeated on the following day. Should the weather be unfavourable, artificial heat is employed. In order to make the quality of the vanilla still more perfect, they are again daily exposed to the sun on mats for about two months. Practice soon teaches the cultivator to know when the fruits are sufficiently dry, to which point particular attention must be paid, as they otherwise lose in weight and quality. When the dressing is finished, the fruits are tied up in bundles of fifty and packed in tin boxes. It happens, however, not unfrequently, that inferior sorts, such as the *puerca* and *pompona*, are placed in the middle of the bundles, instead of the genuine sorts ; of which five kinds are distinguished, viz., *primiera*, which must be twenty-four centim. long, and proportionately thick, and filled with pulp to the pedunculus ; *chica fina*, which is shorter than the foregoing, so that two fruits are counted for one ; *sacate*, which is less thick than the first, and at the base not quite filled with pulp ; *resacate*, which is small, dry, and four are reckoned for one ; these are the fruits which have been gathered before they were ripe ; and *basura*, the most inferior sort, the fruit of which is very small, spotted, and cut or broken.

Formerly, and even at the time when the Spanish colonies were independent, the value of the crop amounted in the district of Misantla to no more than 50,000 St. yearly ; in the year 1844, however, it yielded two millions ; in 1845, three millions, and a further increase of a million may be expected in 1846. Impositions, robberies, &c., appear to be very common in the vanilla trade. Schiede in his botanical reports from Mexico (*Linnæa*, von Schlechtendahl, vol. iv., 1829) says, that besides Misantla, the cultivation of vanilla is carried on also in Papantla, Nautla, and Colipa.—*Buchner's Repertorium*, Bd. xlv., *from the Ann. d. Sciences*, *Août*, 1846.

ON LACTUCARIUM.

In the year 1832, Buchner published his experiments and observations on the formation, properties, and constituents of lactucarium, from *Lactuca virosa*, and observed, that, 1. The milky juice of *Lactuca virosa* loses by drying in the air about half of its weight of water, and yields from fifty to fifty-five per cent. of lactucarium.—2. The medicinally active bitter matter of the lactuca, for which Buchner proposed the name of *Lactucin*, is extracted by water from the lactucarium, along with some salts.—3. *Lactucin* is not an alkaloid, although it is precipitated by tannic acid, but should be classed with sub-alkaloids, devoid of nitrogen, because it forms with acids very soluble, bitter combinations. In alcohol it is dissolved more easily than in water ; in ether it dissolves with more difficulty. This bitter matter cannot be easily obtained perfectly white and distinctly crystallized ; but in the impure yellow-coloured state, it amounts perhaps to eighteen per cent. of the weight of the lactucarium.

4. The volatile part of lactucarium, which has a narcotic opium-like smell, combines with acids, and loses its odour, but it again acquires it by the fixed alkalies. This substance, therefore, is either an ammoniacal compound or a volatile basic substance of a peculiar kind.

5. Among the salts which are extracted from lactucarium by water is one of lime and one of ammonium, in not inconsiderable quantities.

6. Besides the salts and the lactucin, the water extracts also a gum and another substance, insoluble in alcohol, which becomes brown in the air. These substances, which are soluble in water, and without effect, amount to about fifteen per cent. of the weight of the lactucarium.

7. If, after all, lactucin, extractive, gum, and salts have been removed by water from the lactucarium, the residue is gradually treated with cold and boiling alcohol, then with ether, a white *wax-like* substance is deposited when the solution becomes cold, which dissolves in hot alcohol and ether; and there is left in the cold solution a kind of amorphous *soft resin*. These substances, which contribute nothing to the activity of the drug, but retain, rather strongly combined, the narcotic-smelling distillable body of the lactuca, amount to about forty-seven or forty-eight per cent. of the weight of the lactucarium.

8. To those not medicinally-active substances belongs also a glutinous substance to the extent of about nineteen per cent.

In the year 1839, Dr. Walz, of Heidelberg, who does not appear to have read Buchner's paper, also examined lactucarium from *Lactuca virosa*. The chief results of his experiments for the most part confirm those of Buchner, and were as follows:—

1. *Lactucin*, from *Lactuca virosa* is soluble not only in water and alcohol, but also in ether, whilst that of *Lactuca sativa* is not dissolved by ether; they appear, therefore, not to be identical.

2. *Lactucin*, from *Lactuca virosa*, can be crystallised as well as that from *Lactuca sativa*, according to Pagenstecher; it appears under the glass in the form of yellow confused needles. At a higher temperature it easily becomes brown, and is decomposed whilst melting. This decomposition appears to begin below the boiling-point of water. At ordinary temperatures, it is dissolved by sixty to eighty parts of water; in acetic acid and muriatic acid it dissolves easier, although it does not belong to the alkaloids; it contains no nitrogen.

3. The narcotic smelling substance, which is contained in larger quantity in *Lactuca virosa* than in *L. sativa*, appears to be a volatile oil, but which cannot easily be obtained separate by mere distillation with water. By potash this volatile substance becomes developed; but it combines with sulphuric acid.

4. Among those substances contained in the lactucarium, which are soluble in water, there are besides gum, *sugar*, *resin*, a brown humus-like acid, oxalic acid, malic acid, potash, &c.

5. The colourless, tasteless, fusible, and combustible substance of the lactucarium, which dissolves in ether and boiling alcohol, and which Buchner has termed wax-like substance, Walz called *lettuce fat*. This substance is pulverisable in the cold, and yields a white powder. It is naturally combined with the volatile oil of the lactuca: one part of it melts at 100° R., and is scarcely dissolved by spirit of wine, but very easily so by ether; another part, however, melts at 60° R., and is more difficultly soluble in ether.

6. Lactucarium, on being burnt, leaves three per cent ashes behind, which contain carbonate of potash, lime, and magnesia.

G. A. Lenoir, who also appears not to have read Buchner's Memoir, made recently some new experiments with the lactucarium, in order to examine the *wax-like substance* of Buchner, or the *lettuce fat* of Walz, and which he denominated *lactucon*. He had his lactucarium from the district of the Moselle, where it is obtained in the following manner:—In the *L. virosa*, which grows there wild, incisions are made with a thin silver knife, and the milky juice is gathered in cups, in which it is dried. It is then cut in half-inch cubes and sold. It possesses a very marked opium-like smell; on the surface it is more or less yellowish-brown, but on the recent fracture is white. The *lactucon*, which is extracted from it by boiling alcohol, precipitates, on cooling, out of the hot-filtered solution mostly in the form of warts; by repeated crystallization out of alcohol and treating with animal charcoal, it is easily obtained in a pure state.

The lactucon possesses the following qualities:—It crystallizes in fine, colourless, starlike, and wartlike-united prisms; it crystallizes most easily out of petroleum; it is perfectly tasteless and without smell; appears not to possess any medicinal activity; does not dissolve in water, but does so somewhat easily in alcohol, ether, and in volatile and fatty oils. It melts only at a temperature of between 150° to 200° C. without being decomposed. After congealing it forms a transparent amorphous mass; by itself it is not volatile, but in a stream of carbonic acid gas it is for the most part volatilized without being decomposed.

The *lactucon* is, like wax, an indifferent substance; by concentrated caustic potash it is neither dissolved nor saponified; hence Walz has erroneously termed it *lettuce fat*. The alcoholic solution is also not precipitated by metallic salts dissolved in alcohol. In its chemical properties and elementary composition it is very similar to betulin, which is extracted by boiling alcohol from the bark of the birch tree, and which the following comparison strikingly shows:—

Lactucon according to Lenoir.			Betulin according to Hess.		
	p.c.	eq.		p.c.	eq.
Carbon	81.12	40	—	81.30	40
Hydrogen	10.78	32	—	10.99	33
Oxygen	8.10	3	—	7.71	3
	100.00			100.00	

Buchner's Repertorium, xlv.

ON THE PREPARATION OF CHOCOLATE.

BY DR. MÜLLER.

The adulterations, which are so frequently practised with provisions, are of that nature, that the medical police should everywhere direct its attention to them. Chocolate drinkers will be not a little astonished when they hear that certain chocolate manufacturers extract the oil, the so-called cocoa butter, from cocoa beans, and replace it by old rancid mutton tallow, &c. The cinnamon is replaced by ground almond shells, with a sprinkling of cinnamon [cassia?] added to it, and thus this mixture of cocoa is made up by cocoa shells, bean-flour, pea-flour, and all kinds of meal. Instead of vanilla they add a few drops of Peruvian balsam. It is no wonder, therefore, that there can now be bought one pound of chocolate for from eighteen to twenty kreitzers.

"*Mundus vult decipi, ergo decipiatur.*"

Buchner's Repertorium, xlv.

ON QUINOIDINE.

BY DR. F. L. WINCKLER.

In the year 1843, the author discovered that commercial quinoidine contained, besides more or less cinchonia and quinia, also a very large proportion of an alkaloid which was apparently in combination with two different, coloured, amorphous, resinous substances. This alkaloid was amorphous, and yielded only amorphous salts; but in other respects it did not differ from quinia, and had exactly the same combining weight as the latter. The author therefore recommended it to be purified and employed as amorphous quinia in the same way as common quinia. He is, however, of opinion, that Liebig (who has recently proved by ultimate analysis, that these two bodies have the same composition) overvalues the importance of quinoidine. Dr. Winckler obtained from eight ounces of crude quinoidine, only three ounces

of pure, white, amorphous quinine, so that no great pecuniary advantage can be derived from it; whilst, on the other hand, the crude, and certainly cheap quinoidine should not be employed, on account of its variable composition, and its liability to adulteration.

Crude quinoidine having such a variable composition, cannot always be obtained pure in the usual way, by dissolving it in alcohol, ether, acids, &c.; the author tried, therefore, to destroy the foreign substances contained in it, by sulphuric acid of sp. gr. 1.83—1.84, since the latter affects neither the amorphous nor the crystallizable quinia, nor cinchonia. Finely-powdered crude quinoidine was mixed in small quantities with an equal weight of sulphuric acid, so that each portion was separately dissolved before the other was added, an operation not easily performed, since the powder conglomerates almost always, as soon as it is thrown into the acid. After the lapse of twenty-four or thirty-six hours, the mixture is copiously diluted with water, and the deep greyish-brown substance which separates during this process, is filtered off. The latter, well washed, forms, if dry, a loose, amorphous, almost black, not bitter mass (four ounces of the best crude quinoidine, gave two drachms of it). To the filtered liquid (which is clear, dark blue or brown, of an acid, and afterwards bitter taste) whilst boiling, crystallized carbonate of soda is added, until a whitish precipitate forms—a dark-brown resinous mass having already separated on the liquid having been saturated with the carbonate of soda. The white precipitate being formed, as much crystallized sulphate of soda is added, as of carbonate of soda used. The mixture is frequently stirred, boiled in the water-bath for about a quarter of an hour, and then allowed to cool. After some time, the thin film of pale-yellow, transparent, resinous compound covering the surface having been removed, a somewhat hard, resinous, bitter, almost black substance, often covered with some cinchonia, is found at the bottom of the vessel. The compound which covered the liquid is quinoidine, in a purer state; it is to be placed in the vessel intended to receive the filtered solution, whilst the filtrate is mixed with the required quantity of carbonate of soda for the effectual separation of the alkaloid. The almost white precipitate which had formed, dries up, in a few minutes, to a resinous mass, and is now repeatedly washed with hot distilled water. A considerable proportion of quinoidine remains however, still in the precipitated resinous substance; the same is, therefore, pulverized, and for some time digested with diluted acetic acid of about five per cent., till nothing more dissolves. The filtrate is mixed with sulphate of soda, by which a considerable quantity of an almost black resin separates, which adheres to the sides of the vessel. The filtered fluid, which is of a wine-yellow colour, yields upon the addition of carbonate of soda, the quinoidine, which is likewise to be washed with hot water, and dried in the water-bath, together with that obtained before. The quinoidine thus obtained forms a yellowish white powder, which becomes electrical by friction, and dissolves perfectly in acid, spirit of wine, and also in ether, in which latter, a brown, resinous, bitter substance is precipitated. Four ounces of the best quinoidine furnished thirty drachms of purified quinoidine, whilst very inferior sorts only contained a very small quantity of the same. If quinoidine, as it is obtained in commerce, be dissolved in diluted sulphuric acid (1 part to 3—5 parts of water) purified quinoidine is also obtained by the foregoing method, but the separation of the brown, resinous combination takes place imperfectly, consequently the product is less pure. Still the diluted acid is well adapted for purifying inferior sorts of quinoidine from foreign admixtures, which cannot be dissolved by acids.

Experiments were now made to purify quinoidine by ether. Eight ounces of a very excellent sort of quinoidine, obtained from yellow cinchona (*cinchona regia*) were mixed with twenty-four ounces of pure ether. The powder immediately conglomerated into a resinous mass, whilst the ether assumed

a yellow colour, like gold. The ethereal solution having been poured off after a few days' digestion, was treated with animal charcoal and evaporated: four ounces of a pale-yellow, resinous, very bitter residue was obtained. This was converted by the necessary quantity of very diluted pure sulphuric acid into a neutral salt, and the solution evaporated by a gentle heat. Very soon a rather large quantity of pure sulphate of quinia crystallized out of it. This having been removed, no more crystals formed, even by further concentration. The solution was, therefore, again diluted, treated with purified animal charcoal, and the filtrate mixed with the necessary quantity of ammonia for precipitating the amorphous quinia contained in it. The latter separated in the form of a beautiful white precipitate, which, however, soon conglomerated again. It was now washed with distilled water, dried in the water-bath and then pulverised; the powder weighed twenty-eight drachms, and consisted of very pure amorphous quinia. As that part of the amorphous quinia which had not been dissolved by the ether still tasted very bitter, twenty-four ounces of common ether were again added. This acquired a brownish-yellow colour, whilst the undissolved parts changed into a dark-brown liquid of the consistency of treacle. The ethereal solution deposited after some days a considerable quantity of a crystalline mass, and left, by evaporation, about ten drachms of a light yellowish-brown, amorphous, resinous, bitter substance, which, being treated with pure ether, separated into almost colourless amorphous quinia, a considerable quantity of coloured cinchonia, and a deep yellowish-brown, resinous, very bitter compound. When the latter was treated, according to the above-mentioned method, with an equal weight of sulphuric acid, a large quantity of pure amorphous quinia was obtained from it. That part which had remained undissolved, after having been treated with common ether, was dried in the water-bath, triturated, and mixed with diluted acetic acid. By this it was almost all dissolved. On the addition of Glauber salt, however, a rather large quantity of a dark-brown substance precipitated from the liquid, which, after being dried, possessed scarcely any bitter taste, and had a greyish-brown colour. The filtered acetic solution yielded upon the addition of liquid ammonia, a very deep-coloured quinoidine, which gave scarcely any trace of amorphous quinia to ether. The compound which had spontaneously crystallized out of the solution prepared with common ether, was dissolved in spirit of wine of eighty per cent., and the solution after being discoloured by animal charcoal, was filtered whilst boiling hot. On cooling, a large quantity of cinchonia separated in crystals, and also on further evaporation. At last, a small quantity of alkaloid crystallized in the form of fine white prisms. Its nature was the same as the alkaloid before mentioned by the author under the name of *Quinidin*. The cinchonia thus obtained amounted to three drachms, the quinidin to forty grains. Out of the last proportions of the mother liquor there was also obtained by evaporation, a light-brown amorphous mass, from which a small quantity of amorphous quinia could be extracted by concentrated sulphuric acid.

Although it cannot be denied that good quinoidine contains very much alkaloid, there is still even in the best qualities, no part of the quinia free. It is always combined with a resinous substance. The amorphous quinia is further accompanied by a light-yellow compound, which adheres obstinately to it, and renders the purification very difficult. The brown compound appears to be some red cinchonic, changed by the action of the lime; the yellow compound, however, seems to be a peculiar constituent of the bark. Of ten sorts of saleable quinoidine examined by the author, only three contained a comparatively large proportion of amorphous quinia, five contained but little alkaloid, and two only traces of it; and it is in consequence of this varying composition of the crude quinoidine, that it cannot be recommended for medicinal use. It will however, be advantageous to free crude quinoidine

by diluted sulphuric acid (one part acid of 1.38 specific weight, and two parts water) and by pure ether from the foreign admixture, so that it might represent a preparation of equal chemical composition. If ether containing water and alcohol be employed, a quinoidine of a very different composition is obtained, and even if pure ether be used, it will depend on the chemical composition of the crude quinoidine whether the result will be a pure amorphous quinia, almost pure white, yellowish, or yellow like gold. In the latter case, part of the colouring matter might be removed by the formation of the neutral sulphate, and by treating it with purified animal charcoal. This, however, cannot be done without considerable loss. This colouring matter probably does not much influence the effect of the preparation. The yellow amorphous quinia becomes still brown on the addition of concentrated sulphuric acid, and after some time, if water be added, some brown flakes are precipitated. If yellow amorphous quinia be dissolved in muriatic acid, and an excess of chloride of platinum added, a pure, double quinia salt is formed; but if the filtrate be mixed with sal ammoniac and the solution evaporated in the water-bath to dryness, a yellow salt remains as residue, which contains, besides the platinum-chloride of ammonium, a golden-yellow, not bitter, substance, which is insoluble in ether, but is soluble in anhydrous alcohol, and may thus be isolated.—*Pharm. Central Blatt.* 1847, *No.* 20.

EXPERIMENTS ON VALERIANIC ACID.

BY DR. L. ASCHOFF.

Rabourdin was the first who discovered that the dried root of valerian yields a greater proportion of valerianic acid if, during distillation, some sulphuric acid be added to the water, and Dr. Riegel verified this observation.

Dr. Aschoff, when examining these statements, certainly also obtained a large quantity of this valerianic acid, namely, from 15 pounds of the root 18 drachms and $2\frac{1}{2}$ scruples, and at the same time the distilled water was still so acid, that several ounces of crystallized carbonate of soda were saturated by it. This fact induced him to suspect that the liquor must contain, besides valerianic acid, another acid. In order to convince himself of this he distilled a fresh portion of valerian root with water, without the addition of acid, until the last distilled portions no longer offered an acid reaction. The acid obtained was only valerianic acid. Upon this the residuary root in the still was mixed with $4\frac{1}{2}$ ounces of sulphuric acid and again distilled. This second liquor reacted again strongly by acid, and required about five ounces of carbonate of soda to saturate it. The soda salt thus formed contained acetic and formic acids. Both these acids are fixed by lime in the root of valerian, and hence they remain in the residue, if the root be only distilled with water. The addition of sulphuric acid, therefore, in the distillation of valerianic acid is not advisable.

Dr. A. found, moreover, that if the root had only been distilled with water the residue in the still always retains a strong acid reaction, which arises from some resinous substance and free malic acid.

The time of gathering and the age of the root have an essential influence upon the quantity of the valerianic acid yielded. The author found that the root, which had been gathered in the spring in dry places, dried and preserved for a few months, yielded the largest proportion of valerianic acid.

Dr. Riegel says, the *crystallized valerianate of ammonia* can be sublimed; but Dr. A. did not succeed in this, even after repeated experiments. The valerianate of ammonia is best obtained by saturating the oily acid with dry ammoniacal gas, and then applying a gentle heat in order to remove the excess of ammonia.

The valerianate of ammonia thus obtained forms white feather-like crystals,

having a feeble acid reaction. As long as the fluid saturated with ammonia does not colour the litmus red, no crystallization ensues. The crystals, heated in a retort, melt at 25° R., without developing ammonia. On applying a greater heat a white vapour rises which colours litmus red, and condenses on cooling into oily drops, which even after many months do not yet show a disposition to harden. If the crystallized valerianate of ammonia be heated in dry ammoniacal gas, the atmospheric air being excluded, small crystals form on cooling, which melt again on the access of air. The valerianic acid appears according to this to form with ammonia two combinations, which have not yet been analysed.—*Buchner's Repertorium*, Bd. xlv., Heft 3.

ON THE PRESENCE OF IODINE AND BROMINE IN COAL.

BY DR. L. BLEY.

Chief-inspector Mentzell in the Königshütte had discovered traces of iodine and bromine on melting zinc out of galmei, and induced Professor Duflos, of Breslau, to institute some experiments respecting this fact. The latter found distinct traces both of bromine and iodine in the Silesian coals by incinerating them, moistening the ashes with caustic ley, igniting them, and treating them with spirit of wine, &c. He had the kindness to inform me of this, and requested me to examine the coals in our neighbourhood. I accordingly subjected several sorts of coals, from Loebejün and Wettin in the Saal-District, and also some from Zwickau, in Saxony, to examination, and found, at first, only in one sort from the Saal District traces of bromine, but no iodine. I must here observe that a strong smiths' fire was employed to burn the coal powder, moistened with caustic ley, into ashes. After this, when the coal had been saturated with caustic ley, boiled in, afterwards digested with spirit of wine, and then again tested, the reaction showed very distinctly the presence of iodine, the proportion of the latter was even decidedly greater than that of bromine. Another sort from the same district presented only slight traces of bromine. The coals from Zwickau, which till now had only been examined as ashes, did not distinctly re-act, so that I am yet in doubt concerning their nature, but I shall continue the experiments. In brown coal I have till now not been able to discover any traces of these substances. My friend Dr. Meurer, in Dresden, whom I had requested to examine the coals in the neighbourhood of Dresden, informs me that he very easily detected bromine in coals, but that he is yet doubtful as to the presence of iodine. At any rate the existence of this substance in coals is very interesting with regard to geognosy, and still more so with regard to palæontology.—*Buchner's Repertorium*, xlv., Heft 2, p. 255.

ON SOME SPURIOUS SORTS OF OPIUM.

BY M. BATKA.

The high price of this drug, caused by its scarcity, is a great inducement to adulterate it, or for making substitutes for it; and offers a large field for discoveries in pharmacognosy.

The opium, which I have now before me, consists of pieces like that from Smyrna, strewed over, as is usually the case, with the flowers of Rumex, but not wrapt in leaves. It is moreover as shiny as the Egyptian, only of a darker colour. Having been exposed for some time to the air, it is now almost without smell, very hard without being stony, does not become soft in the hand like genuine opium, feels like sand between the teeth, has a bitterish, but not bitter taste, glistens when broken, but is mixed with many light spots like *Resina garannæ*. When tested for resin by friction it shows no electricity; it carbonizes in the flame without melting, and the smell

which it then emits has a remote resemblance to that of frankincense, as it also does when triturated or dissolved.

It is easily triturated, whilst the genuine opium becomes more or less viscid; the powder is brownish and dry; the cold watery solution froths strongly as if from gum—the warm solution does the same, is brown, reddish if held against the light, but becomes cloudy on cooling. Litmus is without reaction on the watery solution; by alcohol an abundant precipitate is thrown down from the filtered solution, in which litmus becomes red after some time standing. The filtered watery solution by evaporation yields gum which burns to ashes. On burning the resinous residue it burns with a sooty flame and a resinous odour, leaving behind a coal which glowed and incinerated, evolving a disagreeable smell like that of animal glue. I thought it worth while to make a qualitative analysis of this opium, the result of which was:—

25 per cent. of matters insoluble in water and alcohol, consisting of—
- 7 per cent. of combustible matters, containing carbon and nitrogen.
- 18 per cent. of incombustible substances, *viz.* sand, traces of iron, lime, and lead,

64 per cent. of substances soluble in water=*Gum.*
9 per cent. of substances soluble in alcohol=*Resin.*
2 per cent. loss.

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100 without any trace of morphia or meconic acid.

This so-called opium is, according to this analysis, decidedly an artificial composition, or rather a daring imposition, for there is not a trace of opium in it.* It was offered to me under the title of a "secondary sort (*beisorte*)" which immediately roused my suspicions. It had very likely been kept with opium, for it had at first the smell of this substance, which it had afterwards lost.

Another adulteration, under the name of "*Egyptian opium*," I saw in London, where I examined under the denomination of "unrated goods," a box with cakes of catechu, which was there imported and consumed as Egyptian opium.

The Egyptian opium has, as is well known, a brown, bright, glistening colour, and by fracture presents here and there lighter, orange-coloured, clouded spots. The opium which I saw, and which I immediately recognised as a product, quite similar to Bengal catechu, by the bitterish and afterwards sweetish taste, resembled this opium perfectly both externally and internally.†

I must also mention another opium-like artificial product, which I received in London through the kindness of Dr. Babington, from Calcutta, under the name of "*Dikki Malei, from the Malabar Coast of India.*" Martius mentions something similar to this, when speaking of the Smyrna opium, but quite different from what I have received: this consists, namely, of rather equally formed opium-like cakes of two inches square, 3′ to 4′ thick, hard and dark, with spots on the surface, shining like gum; when rubbed they

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* By treating the watery solution with dilute acetic acid, saturating with excess of carbonate of potash, filtering, then testing the sediment with nitric acid, no trace of morphia was obtained; the absence of meconic acid was proved by precipitating by sugar of lead, and testing with chloride of iron. By caustic potash and ether no trace of Merk's porphyroxin was discovered.

† An experiment with the mixed sulphates of iron produced the well-known greenish discolourization, and when treated with an excess of sulphuric acid, gelatine, and emetic tartar, which cause no perceptible reaction, the *tannin* was discovered.

develope distinctly a smell of sealing-wax (perhaps arising from the mentioned *tichi* oil?) the fracture was like that of guaiacum, greenish yellow, and resinous, with brownish catechu-like spots (from the betel nut?). It is of a very peculiar astringent taste, sticking to the teeth and leaving behind, when chewed, an orange-yellow powder, which contains, however, no rice flour, but only gum resin.* Merk observes in his chemical diagnosis of opium, that the opium obtained under the name of *Constantinople opium* contains the greatest proportion of sulphate of morphia. I have, therefore, always used acetate of baryta as a reagent in the examination of opium, in order qualitatively to determine the best sort; and, in fact, only the best Smyrna opium reacts upon it, and the Patna, Benares, English, Grecian, and Egyptian opium are at the utmost only clouded by it, but throw down no precipitate.—*Buchner's Repertorium*, Bd. xlv., Heft 3.

PHARMACY IN CHINA.

The Chinese are in advance of the English in the regulations established for the practice of Pharmacy, as none but qualified men are allowed to engage in business as Pharmaceutists in China, which is not yet the case in England.

The Emperor of China has decreed, by a law passed in May, 1846,

1st. That the proprietor of every Pharmaceutical establishment shall be required to have a diploma, signed by three members of the Academy of Medicine, who shall testify to his competency, after having satisfied themselves by an examination.

2d. That every Pharmaceutist shall be required always to keep camphor, rhubarb, and liquorice, in his shop.

3d. That purgative salts, calomel, laudanum, arsenic, and other similar substances, shall only be sold when ordered by the prescription of a medical man, or sanctioned by a magistrate.

The Pharmaceutist is also required to keep a sufficient supply of *Ginseng root*, and to superintend the growth of the plant furnishing this very costly, but favourite Chinese remedy.—*Repertoire de Pharmacie.*

ANTIMONIC ACID AND THE ANTIMONIATES.

BY M. FREMY.

Antimonic acid and an antimoniate of potash, are used in medicine; another antimoniate of potash is also used as a test, having been recommended by M. Fremy as a means of distinguishing soda from potash. The following is extracted from M. Fremy's paper, entitled, *Researches on the Hydrates*, read before the Academy of Sciences:—

I wished to ascertain whether antimonic acid did not, like stannic acid, combine with water in several proportions. With this view I compared the hydrates obtained by the decomposition of perchloride of antimony with water, and by the precipitation of an antimoniate with an acid.

The result of my investigations is, that antimonic acid obtained by different methods and dried by exposure to dry air, has a uniform composition, and that it consists of one equivalent of antimonic acid, and four equivalents of water.

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* According to a superficial examination the *Dikki Malei* cakes consist of:

95 per cent. substances insoluble in water—*viz.*
- 60 resin.
- 35 other organic substances and sand.

5 per cent. *tannin* and gum, soluble in water.

100

On referring to the characters of hydrated antimonic acid, prepared under different circumstances, no difference can be detected, so that there appears every reason to conclude that there is only one hydrate of antimonic acid, or at least that other hydrates are not easily obtained.

But if the hydrate of antimonic acid presents but few points of interest, this is not the case with the combinations of the antimoniates with water.

I have found that each antimoniate combines with water in several proportions, forming triple groups, or species of double salts, which cannot be compared to the ordinary hydrated salts, for each group has peculiar chemical re-actions, which change with every change of hydration.

Thus, antimonic acid forms with potash a neutral anhydrous salt, composed of one equivalent of acid and one equivalent of potash. This salt is completely insoluble in water, and only becomes soluble by long-continued boiling. It is this antimoniate that is produced when antimony is deflagrated with nitre ; it has been generally considered to be an acid antimoniate. This is the compound employed in medicine under the name of *washed diaphoretic antimony.*

This salt combines with water in two different proportions ; one of these combinations contains seven equivalents of water, and is crystallizable ; its peculiar characteristic is that of forming in salts of soda a crystalline precipitate almost insoluble in water.

If it be boiled for a few minutes the crystalline antimoniate of potash becomes hydrated, and changes into a gum-like salt which has lost the property of precipitating the salts of soda. If this last salt be gently dried it is slowly dehydrated, passing into the anhydrous modification of antimoniate of potash, which is insoluble in water.

The other antimoniates form with water, as the salt of potash does, two series of hydrates possessing similar characters.

Thus, antimoniate of ammonia, which I have very carefully examined, combines with water in two proportions. One of these hydrates is composed of one equivalent of antimonic acid, one equivalent of ammonia, and six equivalents of water. It is crystalline, and precipitates the salts of soda. The other hydrate contains one equivalent less of water, and is completely insoluble in water. The weakest influences, such as that of a slight elevation of temperature, or the action of light, are often sufficient to determine the separation of an equivalent of water from the crystalline antimoniate of ammonia, and to tranform it into insoluble antimoniate.

After having established the constitution of the antimoniates, and the important part which water performs in this class of salts, I have especially studied the antimoniates which may be employed as reagents for detecting the presence of soda. I have ascertained that by means of this reagent the presence of one per cent. of soda in the potash of commerce may be easily detected.—*Repertoire de Pharmacie.*

ON THE USE OF CARBONATE OF AMMONIA IN BREAD.

BY M. ANGILLIS-MORTIER.

For many years the bakers have been, from time to time, summoned before the civil authorities for using sulphate of copper in the manufacture of their bread. Finding, however, that Chemists had no difficulty in detecting this fraud, they had recourse to other adulterations, and used sulphate of zinc, alum, or carbonate of potash, in the hope that these would not be so easily found out ; but in this they were mistaken. It is very easy to effect adulterations by the use of substances which may be readily detected by chemical reagents, but to do so in such a way that the detection shall baffle the art of the most experienced Chemist, is certainly

the perfection of fraud; and as this appears to have been now attained in the manufacture of bread, it is desirable that the subject should be publicly noticed. The fraud to which I allude consists in giving to bread made from a mixture of rye and wheat flour the character of wheaten bread, by the addition of a solution of sesquicarbonate of ammonia, in mixing the dough. The effect of this addition is to make the bread lighter, whiter, and more porous, than it would otherwise be; yet not a particle of the ammoniacal salt can be detected after the bread has been taken out of the oven. The object of the baker, of course, is to use a cheaper kind of flour, and thus get a larger profit; but as it is proved that rye is less nutritive than wheat, it becomes of some importance to the public that means should be adopted for preventing this substitution.—*Journal de Pharmacie d'Anvers.*

ADULTERATION OF WHEAT FLOUR.

BY M. MARTENS.

The following are the means proposed by the author for detecting the adulteration of wheat flour with the flour of potatoes and beans. It is known that potato starch is entirely insoluble in cold water when it has not been rubbed to a powder, so that the grains have remained entire; but if they are crushed in an agate or glass mortar, and water is then added, this dissolves a little of the starchy matter; and on filtering the mixture, after a few minutes' maceration in the cold, a clear liquid is obtained which is coloured blue by the addition of tincture of iodine; if pure wheat flour be treated in the same manner, the colour of the liquid is not altered, according to M. Martens, by the addition of iodized water, undoubtedly because the granules of wheaten starch are far more minute, and are enveloped in a coating of elastic gluten; they thus escape being crushed by the pestle so as to expose the central portion which is capable of dissolving in cold water. M. Martens has found that a mixture of five per cent. of starch may be detected, if the flour be rubbed strongly for five or ten minutes, with the precaution of triturating but little at a time.

Another adulteration, which is tolerably frequent, consists in mixing bean flour with wheaten flour. M. Martens' process for detecting this fraud, is based upon the presence of legumine in bean flour. The suspected flour is mixed with twice its volume of water, and allowed to macerate at a temperature of 68° to 86°, stirring from time to time; the whole is then poured on a filter, and washed with a little water to extract the whole of the legumine. If the filtered liquid contains any legumine, it becomes turbid and milky when a little acetic acid is very gradually added to it; it is also precipitated by the third hydrate of phosphoric acid. This process, which is very easily executed, enables us to detect the flour of beans or any other leguminous plant in that of wheat, even when the amount does not exceed five per cent.—*L'Institut*, Feb. 17, 1847.

DETECTION AND QUANTITATIVE DETERMINATION OF TALLOW OR STEARIC ACID IN WAX.

BY E. GEITH.

The author considers that the detection of the adulteration of wax with tallow or stearic acid, can only be effected by an agent capable of separating the adulterating substances from the wax. After numerous experiments, he found in carbonate of soda, a substance possessing this power. This salt, dissolved in water, and employed in excess, is able to saponify the tallow, and consequently also to combine with the stearic acid. The wax, however, is

under certain conditions, not at all, or only very slightly affected by it. But if pure white or yellow wax be boiled in a porcelain capsule with an equal weight of carbonate of soda, and six times its weight of distilled water, and at the same time constantly stirred with a glass rod, until the bottom of the capsule begins to be coated with carbonate of soda, a not inconsiderable part, even of the purest wax, will become saponified. Whilst the mass is still hot, about six times its weight of alcohol of eighty per cent. are to be added, and the whole rubbed down with a pestle, adding at the same time gradually about sixteen or eighteen parts of alcohol, of fifty per cent., until the undissolved parts are seen floating in the liquid in a finely divided state. The mixture is then to be placed on a filter. On the addition of excess of an acid to the filtered liquid, we obtain a rather abundant white or yellow precipitate. This clearly proves *that the wax contains a substance which is easily saponified by carbonate of soda.* It was therefore necessary to discover some means by which this saponifiable substance might be separated from those parts of the wax which cannot be saponified by carbonate of soda, and at the same time also from the tallow and stearic acid. I found that alcohol answers this purpose ; *it dissolves this saponifiable substance in great quantity,* whilst the dissolved proportions of tallow and stearic acid, and of the not saponifiable wax, are but very inconsiderable.

In order, therefore, to detect an adulteration of wax, we must first examine whether it be adulterated with stearic acid. For this purpose, we put into a retort about two drachms of the wax, and pour over it *one ounce* of lime-water, and *one ounce* of distilled water, and boil for some time. *If the wax does actually contain stearic acid, the liquid completely loses every trace of alkaline reaction.* This fact has already been mentioned by others, but with the addition, that the liquid throws down a precipitate of stearate of lime ; I must, however, contradict this observation, for, notwithstanding repeated experiments which I have made, I was not able to discover anything of the kind. I found, moreover, that even turbid lime-water became clear, whether boiled with pure wax, or with wax adulterated with either tallow or stearic acid, but it did not lose its alkaline reaction in the two first cases. Lime-water furnishes us, therefore, with an excellent test of the presence of stearic acid in wax. It is also useful in determining the quantily of stearic acid present ; for the more lime-water of constantly equal strength is deprived of its alkaline reaction, by a given quantity of wax, adulterated with stearic acid, the more of the latter must the wax contain.

No stearic acid having been detected, the wax remains yet to be tested for tallow, which is done in the following way :—

One dram of wax is put with two ounces of alcohol of eighty per cent. in a retort, boiled for a few seconds, and the whole quickly poured into another vessel, which contains one ounce of cold alcohol of eighty per cent. The retort is to be washed out with another ounce of boiling alcohol. After several hours, when quite cold, the mixture is filtered, and two ounces more alcohol, of eighty per cent. poured on the residue. After all the alcohol has passed through the filter, the latter is wrapped up in a few sheets of filtering paper, and pressed between two bricks until it no longer appears moist. The wax is now placed in a porcelain capsule, with one dram of carbonate of soda and six drams of distilled water, and boiled until the bottom of the cup begins to be covered with carbonate of soda, constantly stirring it with a glass rod. One ounce of alcohol, of eighty per cent. is then to be added to the hot mass, and the whole rubbed down with a pestle until the undissolved parts form a fine powder ; while at the same time a few ounces of alcohol, of fifty per cent., are gradually added. When cold, the whole quantity is carefully filtered and washed with alcohol, of fifty per cent., as long as the filtered liquid is rendered turbid, by a solution of neutral acetate of lead with acetic acid.

The whole filtered liquid is now to be reduced by evaporation in a porcelain capsule to one ounce, and when perfectly cold, again filtered, and the residue washed with water mixed with alcohol, as long as the washings are rendered turbid by a solution of acetate of lead acidified by acetic acid.

Having thus obtained about two ounces of liquid, it is to be poured into a medicine bottle, and well shaken; *if the wax was pure, a slight froth will form, but will disappear after a few minutes*; *if, however, it was adulterated, with, even only to the extent of from two to four per cent., tallow or stearic acid, a very abundant froth forms itself, which does not disappear until after half or one hour.*

Another test may now be made, by adding to the liquid in the bottle an excess of acetic acid. If the wax was pure, the liquid will at the most become scarcely perceptibly opalescent, but not distinctly turbid. If it contains, however, tallow or stearic acid, a more or less abundant flakey precipitate will be formed after a short time, particularly if the bottle be shaken. Gradually these flakes rise to the surface of the liquid. If it is desired to determine the quantity of tallow or stearic acid present, the liquid is not to be mixed with acetic acid, but is to be treated in the following manner: add to it a solution of acetate of lead, as long as a precipitate falls down, then add acetic acid until the liquid acquires a distinct acid reaction. The precipitate is to be allowed to fall down for several hours, then placed on a weighed filter, dried in a temperature of 212° Fahr., and washed with *cold* distilled water, as long as the washings become brown, by the addition of sulphuretted hydrogen water. Then place the residue in a small porcelain capsule and weigh it again, after having perfectly dried it in a temperature of 212° Fahr.

If the wax is pure, one dram of the original precipitate will have been reduced to one-half two-thirds grain. If ten per cent. of tallow were mixed with it, the precipitate will now weigh two to two-and-half grains. If twenty per cent. tallow, it will be three three-fourths to four one-fourth grains.

Unfortunately, the quantity of the precipitate is not constant, even with the utmost care. The quantitative adulteration of wax by stearic acid is more easily detected; for one dram of wax, adulterated with five per cent. of stearic acid, gives, when treated in the above manner, 2 to $2\frac{2}{3}$ grains of precipitate; with ten per cent. 4 to $4\frac{3}{4}$ grains; with twenty per cent. eight to nine grains. The yellow wax does not materially differ in this respect from white wax, and its adulteration can be detected in the same way.

POSTCRIPT BY DR. BUCHNER.

The author of the foregoing prize essay has accompanied his *brochure* with ten samples of wax; 1. perfectly pure white wax; (2) white wax adulterated with two and a half, five, ten, twenty, thirty, and fifty per cent. stearic acid; 3. white wax adulterated with five, ten, and twenty per cent. of tallow. The judges have come to the conviction, that these adulterations could only approximately be discovered by an exact comparison of the *melting degree*, and of the *specific weight*, if the *chemical test of Mr. Geith* was not made use of. The sensible properties, smell, colour, brilliancy, transparency, softness, toughness, fracture, and texture, are not safe indications for an adulteration, and although wax mixed with equal proportions of stearic acid is, in a cold state, considerably more brittle and less soft and pliable, than pure wax, still this difference is, in an adulteration with twenty to thirty per cent. of tallow or stearic acid, not great enough, as to discover with certainty the degree of adulteration.

M. Lepage, of Gisors, has compared the different melting points of pure bees'-wax and of tallow, and also of given mixtures of these two substances, and has found, that it is possible, by means of this physical test, to discover with certainty the purity or adulteration of wax. M. Legrip, of Chambon,

has closely examined this wax test of Lepage, and found it perfectly correct and safe, as far as no great exactness with regard to the quantity of the admixed tallow is required.* This method has this advantage—that it is easily performed, not expensive, and causes no great waste of wax. It is done in the following manner:—

In a quantity of melted wax the bulb of a thermometer is immersed, so that it is covered with a moderately thick coat of wax, and when perfectly cold, the thermometer is fastened with a cork into a retort with a long neck, so that the bulb of the thermometer is suspended in the body of the retort. The latter is then placed in a vessel filled with water, which is slowly heated over a moderate fire, the globe and the scale being closely watched. As soon as the wax begins to melt and to drip off, the degree of temperature is marked down and compared with the following scale, given by Lepage and Legrip:—

Pure tallow melts at						46° C.
A mixture of	19	parts of	tallow, and	1	of white wax, at	47.0 C.
"	7	"	"	1	"	49.5 C.
"	5	"	"	1	"	52.5 C.
"	3	"	"	1	"	55.5 C.
"	1	"	"	1	"	59.0 C.
"	1	"	"	3	"	60.5 C.
"	1	"	"	5	"	61.5 C.
"	1	"	"	7	"	62.5 C.
"	1	"	"	11	"	63.0 C.
"	1	"	"	19	"	64.0 C.
Pure white wax						64.0 C.
Pure yellow wax						64.0 C.

The difference between the melting point of wax, and that of tallow is, therefore, 18°, which gives sufficient scope for comparison; still the melting point of a mixture of given parts of wax and tallow, cannot be determined by calculation, if the melting points of wax and tallow alone are given; for according to theory, a mixture of fifty parts of wax, and fifty parts of tallow should melt at 55° C. as $\frac{46+64}{2} = 55$, but experimentally it was found to be at 59° C.; we must moreover observe here, that the melting points found by Legrip do not quite agree with those given by Lepage.

M. Legrip is, therefore, of opinion, that a more correct cerometer could be obtained by comparing the *specific weights* of wax and tallow. He found the specific weight of *the white and yellow wax* to be = 0.962, and that of *tallow* = 0.881. If, however, these data be compared with those given by other experimenters, we find also here considerable discrepancies; for according to Muschenbrock and Brisson, the specific weight of the yellow wax is 0.960—0.964, and that of white wax 0.966—0.968. The specific weight of sheep tallow Muschenbrock found to be = 0.943, and Brisson = 0.923. That of bullocks' tallow is after M. = 0.955, and after B. = 0.923, consequently much greater than Legrip has found it.

The principle of Legrip's cerometer is, however, notwithstanding these differences, correct and worthy of notice; it is this—alcohol, of a given specific weight, is diluted with so much water, that the wax placed in it at a temperature of 15° C., neither sinks nor swims on the surface of the fluid, but keeps in the middle of the same; it is then only necessary to employ the areometer, in order to determine from the specific weight of the alcohol, the purity or the degree of adulteration of the wax. Assuming the specific weight of the wax to be = 0.962, its purity is established, if it keeps in the midst of alcohol of this specific weight, or of 29° by Gay Lussac's

* *Journ. de Chim. Med.*, 1845, p. 34.

areometer, whilst a specific weight of 0.881 or 46° after Gay Lussac, indicates the pure tallow. A mixture of these two standard fluids, taken at equal parts, represents a mixture of equal proportions of weight of wax and tallow, and corresponds with 37°.5 on Gay Lussac's areometer :—

33°.3	G. L.	areometer	=75	wax,	and	25	tallow.
37°.5	"	"	=50	"	"	50	"
41°.7	"	"	=25	"	"	75	"
46°.0	"	"	= 0	"	"	100	"

ON THE OCCURRENCE AND GEOGRAPHICAL DISTRIBUTION OF THE GENUINE CINCHONA (*CINCHONA CONDAMINEA*), AND OF OTHER CINCHONA SPECIES IN THE NEIGHBOURHOOD OF LOXA.

BY DR. VON MARTIUS.

J. J. Caldas, pupil of the celebrated Spanish botanist *Mutis*, of Santa Fe de Bogota, travelled from 1802 for many years in the mountains of Peru, in order to examine the natural history and geographical distribution of the cinchona trees. For this purpose, he examined in 1803 the forests of Malbucho, and travelled afterwards to Yntac, on the western declivity of the Cordilleras in 0° 26′ north latitude ; in 1804 he visited the neighbourhood of Jagualó and Macuchi, also at the western declivity of the above-mentioned mountains in 0° 53′ 19″ and 0° 56′ 21″ south latitude, further the mountains of Alausi, Cibambe, Pante, Jaday, Gualacco, in the neighbourhood of Cuenca, and lastly that of Loxa, on which travels he described on the spot twenty-two sorts of cinchona trees, of the most of which he also made drawings of the organs of fructification. In the year 1805, he was ordered by the then Viceroy of Peru, Baron de Carondolet, to communicate his observations on the cinchona of Loxa. This he did in a memoir, under the title of *Memoria sobre el estado de las Quinas en general y en particular sobre la de Loxa*. He added a map of the elevations and transverse sections of the cinchona ravines in the Quito district.

After about ten years, Caldas's manuscript, together with the botanical descriptions and drawings, with notes continued to 1809, but without the map, were bought by Mons. Henry Ternaux, who resided at Popayan, as Attachè to the French embassy in Columbia. This gentleman communicated the manuscript to Dr. Von Martius in Munich, who laid it in the session of May the 9th, 1846, before the Royal Bavarian Academy, accompanying it with oral expositions. As this Memoir contains much instructive information, by which the geographical knowledge of such an important plant as the cinchona may be enlarged and corrected, even now, forty years after it had been written, and since as yet no part of it has appeared in print, the Academy has resolved to publish the most important contents of it through the public journals.

Crown Bark.—Caldas describes, first, in his memoir that sort which represents the so-called Crown-bark, of which, under the Spanish government, 500 arrobas* yearly were obliged to be gathered and sent to the court-apothecary in Madrid. This bark is taken from *Cinchona Condaminea*, Humboldt and Bonpland, which these travellers examined themselves during their residence in Loxa, and described and given drawings of in the *Plantés Equinoctial*, I. 10.† The explicit description given by Caldas, coincides in

* One arroba=twenty-five pounds, or quarter of a hundredweight.

† Botanists and pharmacologists do not yet agree with regard to the *species* of *Cinchona* from which the different sorts of bark are taken. *Göbel* thought *Cinchona Condaminea* yields that thin-tubed brown bark, which is exported from Loxa, and is now but little met with in commerce;

the more essential points with that of the two last-mentioned travellers. He also mentions that the tree varies very much, of which Humboldt says, that he does not know any tree which varies in the form of its leaves so much as the *Cinchona*. Caldas places particular value upon the glandular spots on the inferior surface of the leaves near the insertion of the veins from the rib of the leaf, and which first Don Vicente Olmedo (who had then been thirteen years superintendent of the cinchona crop in Loxa), and after him Humboldt, noticed.

In Loxa itself, this sort is called *cascarilla fina amarilla*. The connoisseurs in the country distinguish *cascarilla fina colorada*, of which Caldas gave also a description, accompanied with drawings.

There is no characteristic difference between these two sorts, the only distinguishing mark is, that the fresh bark of *c. f. colorada* is in the interior of a reddish colour, whilst that of *c. f. amarilla* inclines more towards yellow; if, however, the latter have become perfectly dry, it assumes also a reddish colour, so that even the most experienced connoisseur cannot distinguish the two sorts one from another. The tree which furnishes the *c. f. colorada* is described as having somewhat thicker, more obtuse, and less narrowed leaves, a larger and more beautiful pink-coloured corolla, and a somewhat thicker capsular fruit; they grow both together in the same places. Perhaps the variety β *Chaguarquera* of *Cinchona Condaminea* (De Candolle, Prod. IV. p. 352) might be added to these; but we must observe that Caldas distinguishes by the name *chaguarquera*, a third sort, which

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whilst that thin-quilled brown sort, which has more recently become known as *Crown-bark*, or *Loxa-bark*, is obtained from *Cinchona scrobiculata*, Humb. and Bonpl.; he believed farther with Hayne, that the genuine royal bark (yellow bark) comes from *Cinchona cordifolia*, Mutis. But all these assumptions are founded only on suppositions, and it is well known that that bark which A. von Humboldt has peeled off in Peru from *Cinchona Condaminea*, and brought to Berlin under the name of "*Quina de Loxa*," is not identical with that sort which comes in commerce as Loxa-bark (Hayne). I have had opportunity to make experiments, which are in favour of the observations made by *Caldas*, namely, that the *Quina regia* comes from *Cinchona Condaminea*. When Napoleon ordered, in 1806 and 1807, the continental blockade against the English trade, the price of bark rose considerably in Germany, and in 1808 an entire want of this valuable remedy was to be expected. The Bavarian government, in consequence, issued orders that a sufficient stock of this article, and others, should be provided for the hospitals in Munich. The merchant, who undertook to procure it, received from a house in Amsterdam a few boxes of bark, under the name of "*Quina de Loxa*." The price of the same was very high, but its efficacy corresponded indeed with it; there cannot possibly exist a bark of a better quality. The stock was so large, that it sufficed till 1815. Unfortunately, I only possess a very small sample of it, but I can see from comparison that this bark was an exquisite *Quina regia*. It consisted mostly of quills, of the thickness of the thumb, and half to one and a half-foot long the epidermis, and was rusty-brown, with many deep transverse chinks, and partly covered with whitish-grey crusty lichens; the fibrous layer of liber had a cinnamon colour; it smelt but weakly, but possessed a distinct, more bitter than acrid, taste; the decoction of this bark became very milky on cooling, and the pale wine-yellow infusion formed, both with infusion of galls and also alkalies, very abundant precipitates. This *Quina de Loxa* was prescribed only as powder or decoction, and cured fevers safely and mostly in very short time, and I think it very likely that this bark is identical with that, which, according to Caldas, is obtained from *Cinchona Condaminea*, Humboldt and Bonpl. (*Cinchona officinalis*, Linn.). Buchner.

(as De Candolle observes) has oblong leaves, more strongly-curved veins, the stamina reaching up half the corolla (somewhat longer than in the genuine *Cinchona Condaminea*), and a shorter pistil. For the name *chaguarquera* he cannot account. The natives think that this bark possesses weaker medical properties than that of *c. f. amarilla* and *colorada*.

Considering all these facts described by Caldas, it is probable that this genuine *Cinchona Condaminea* varies not only considerably with regard to the form of its leaves, but also with regard to the dimensions and proportions of the parts of its flowers, similar to what we meet with in our *Primula veris*, in which also the insertion and length of the stamina and the length of the pistil vary according to the locality and other not yet sufficiently established causes. The chief characteristic, however, by which the *Cinchona Condaminea* might be distinctly recognised, would be the form of the fruit, which, compared with other officinal sorts is always short (6′ to 7′ Paris measure) and ovate.

Next related to this genuine *C. Condaminea*, appears in Caldas's description a sort (or variety?) which is called by the inhabitants of Loxa *Crespilla hoja de Lugma*. It agrees with the first, in the presence of the small glands on the leaves (by which also *Cinchona scrobiculata*, Humb. from Jaen de Braeamoros is distinguished) but its leaves are narrower and strictly lanceolate, the capsule is more oblong (8.6′ long, and 3.8′ broad) and is said to have a very inferior bark, which the natives signify with the expression *Crespilla*.

In how far the opinion of natives of Loxa, with regard to the different qualities of their bark, is founded on medical experience, is not mentioned by Caldas, and we may suppose that many prejudices prevail in this respect. What may be asserted with a high degree of certainty, is, that the distinction of even that sort, which was collected on royal account, depended solely upon the experience of the collecting labourers, and that the great variety in the effects of that bark, which comes into commerce from Loxa itself, is a consequence of the most genuine *c. f. amarilla* and *colorada*, being mixed with those of ten other sorts, which all grow in the neighbourhood of the town, together with *Cin. Condaminea*. Of the latter, Caldas expressly maintains, that it extends only over a small district, and belongs exclusively to the mountains and neighbourhood of Loxa. This badly built town, containing about 2000 inhabitants, is situate in a narrow valley, according to Caldas's own observations, in 4° 1′ 2″ 5 south lat. (according to Condamine, in 4°) and 0° 57′ 30″ west long. In the east, this valley is formed by the eastern branch of the Andes, which is called Cordillera de Zamora, in the west by the chain El Villonaco, which joins the chief Cordillera of Caaxnuma. No tertian fever prevails in the immediate neighbourhood of the town, but it is carried over by the inhabitants from Catamayo. Although, however, this part of the world ought to be least haunted with this evil, being so well guarded by its cinchona forests, still the inhabitants suffer much by these fevers, because they do not make use of this sovereign remedy. Particularly the Indians, among whom the fever often makes great inroads will not hear anything of cascarilla (as they call it, and not cinchona). They have the belief that it heats the blood and the humours, and the heaviest chastisements are often required to be inflicted in order to force them to employ this remedy. This circumstance is the more striking, as the Indians still adhere with the greatest obstinacy to their inherited customs, prejudices, mysteries, vices, and idolatry, and the use of the bark has been found among the natives at the conquest by the Spaniards, as is reported by Condamine, Savary, Ruiz, and others.

The temperature of the neighbourhood of Loxa is very agreeable, varying between 10° and 16° Reaum., and keeping the greatest part of the year between 14° and 15°. The barometer shows, according to numberless ob-

servations by Condamine (who found first 260, later 265) the average of 263.6′ (21.9 Paris inches). The elevation of the town above the level of the sea, is, according to Condamine, 1100.0 toises = 2566 varas, Castellan. According to Humboldt, 1006.0 toises=2347 varas, Castellan ; according to the observations and calculations of Caldas, 1002.7 toises ‡ = 2339.6 varas, Castellan.

As regards the geographical distribution of the genuine cinchona of Loxa, it is found abundantly, and in clusters in the forests near Loxa. It is, however, only met with from 3º 12′ south lat. towards the south, so that this latitude may be considered as its north terminus. It coincides with the mountain chain, which separates the rivers between the Rio Saragura and the Rio de Loxa, which latter assumes farther downwards the name Rio de Zamora, and joins the Marannon below San Jago. From Ajabaco in 4º 40′ south lat., the *Cinchona Condaminea* no longer occurs, so that it may be considered as indigenous exclusively between 3º 42′ and 4º 40′ south lat. and the latter latitude as its southern terminus. Although Saraguru, Cuenca, Cibambe, Paute, and other places possess a similar temperature and elevation to the above-mentioned district, still not one trunk of the genuine Quina de Loxa has been found there. It is, therefore, not at all to be supposed that this beautiful tree grows in all possible elevations of the Andes chain ; it avoids both the cold and hot climates, and grows only in temperate ones. The centre of the zone, in which the cinchona is found, corresponds with a third of the total height of the Andes. The Chimborasso reaches, according to the observations of Humboldt, 3267 toises above the level of the sea, a third of the entire height of the Andes, is therefore = 1089 toises.

The upper terminus of the cinchona falls to 1380 toises, the inferior at 813.5 toises. Now, 1380.0—813.5 = 566.57 : $\frac{566.0}{2}$ = 283.2 + 813,5 = 1096.7 toises,§ or 2558.9 varas, according to Castellan, which corresponds with the height of a middle line in the cinchona-zone ; so that the difference between that line in the cinchona-zone, and a third of the height of the Andes, amounts only to 7.7 toises.

(*To be continued*).

INQUEST AT PUTNEY.

On the 8th of July an inquest was held at Putney, and continued by adjournment to the 14th, before W. Carr, Esq., coroner for East Surrey, on the body of Sophia Dallett. Maria Rose Dallett, sister of deceased, deposed that on Sunday, the 3d, her sister, who had been slightly indisposed for two or three days, was taken with shivering and sickness. Witness sent to Mr. Farmer, Chemist, of Putney, for some medicine.

John Farmer, Chemist.—I recollect Elizabeth and Mary Anne Dallett calling at my shop on Sunday evening. I proposed to give them a powder and a draught for the deceased, who was said by them to be fifteen years of age. No particular kind of medicine was asked for. Minutely inquired into the symptoms. The powder consisted of four grains of *grey powder*, to be taken at bed-time. Grey powder is the mildest preparation of mercury. The draught was a common black draught of senna and other ingredients. On Monday evening Miss Mary Anne Dallett called and stated that the powder had been rejected from sickness, and the draught had acted only once, and that mildly. She said that the deceased would require more active medicine, and that she had pain. In consequence of this statement, I gave a powder composed of five grains of grey powder

‡ One toise=6 Paris feet ∴ 1002.7 toises= 6016.2 P. feet.

§ 6580.2-feet.

and three grains of Dover's powder. I added the Dover's powder that the dose might be retained on the stomach. I gave on this occasion a draught, the same as the former, to be taken in the morning. I also suggested and supplied a simple saline mixture, directing two table spoonfuls to be given if the sickness came on. The quantities of the various medicines which I supplied were the usual quantities for a person of the age of deceased. I have been in the habit of supplying the family of deceased with my mild antibilious pills. They contain in each pill one grain of blue pill. They are mild pills. I have no objection to state of what they are composed. In addition to the blue pill, they contain extract of scammony and the watery extract of aloes. One is an ordinary dose for a person of the age of deceased; but two are quite safe for one of constipated habit. On Sunday evening I was informed by the sisters of the deceased that the bowels of deceased had not been acted on since Friday, and I was told that she was complaining of headache, giddiness, sickness, and pain of the stomach. The illness was described as a little bilious attack. I do not visit patients. I did not prescribe for the deceased; but I suggested and dispensed the medicine for her.

John Rose Cormack.—I am a doctor of medicine, and reside in Putney. I was first called in to the deceased on Tuesday, the 5th, at nine in the morning. I found the deceased in bed. I was told that the disease set in with shivering. I certainly understood that no medicine of any kind had been given, excepting a brown powder on the preceding evening, and a black dose that morning; and that these medicines had been got from "over the way." I could get no definite or distinct account of the medicine, excepting that the powder was brown and the draught black. I concluded that both were ordinary aperients; and proceeded to examine the patient for myself. I found the pulse feeble and irregular; the heart's action was feeble and irregular. The tongue was loaded, but not parched. She seemed to be in an extremely depressed state. I thought the pupils were somewhat contracted. I examined into the state of the secretions. The symptoms led me to dread pressure on the brain, such as is seen in the course of continued fever. I intimated this opinion to the relatives. Nervous fever of this kind is a very serious disease. In reference to the abdominal pain, which was severe, I said, "Let us hope that it is only the medicine." I did not convey, or wish to convey, the idea that the disease arose from improper medicine had from Mr. Farmer's. I had a dread that it might be a severe form of abdominal inflammation, well known to medical men as a dangerous complication of continued fever. In prescribing, my object was to support the powers of life, and to allay the vomiting and purging. I prescribed a mixture to be taken in two doses. The following is the composition:—Of the Edinburgh solution of the hydrochlorate of morphia twelve drops, tincture of orange peel one drachm, and of camphor mixture two ounces. The morphia in this mixture may be estimated as equal to half a grain of opium. With this mixture I sent another, one ounce and a half of the creasote mixture of the Edinburgh Pharmacopœia; half to be taken one hour after the last dose of the other mixture. Creasote is of use in allaying vomiting. The opium was intended to check the discharges, and arrest inflammatory action, by keeping the intestines in a state of repose.

My second visit to deceased was between twelve and one. The pulse was improved. On carefully examining the abdomen with the hand, I found that the pain on pressure had materially increased since my first visit, and the vomiting and purging, though diminished, still continued, in spite of the remedies. I directed one part of the creasote mixture to be taken. I ordered a stimulating liniment to be applied to the seat of pain as follows:—Spirit of turpentine 5 drachms; liniment of the sesqui-

carbonate of ammonia, of London Pharmacopœia, 5 drachms; and of laudanum, 2 drachms—a drachm is 60 drops. I directed part of this liniment to be applied to the abdomen by means of a piece of flannel, and above the flannel, hot water fomentations for two hours. I prescribed three pills to be taken, one every hour, in the event of the pain, purging, or vomiting remaining. I called about eight in the evening. I found a very great apparent improvement in all the symptoms: the pulse in particular was much better, being less rapid, as well as stronger and firmer. I was told that there had been no recent purging, and vomiting had not returned. I thought more favourably of her case than I had done formerly; but I was still in great anxiety about her. I was called between four and five in the morning. I found the deceased in a state of great prostration, apparently listless and drowsy. The pulse was hardly perceptible; the hands were cold; the extremities of the fingers were blue; and the lips were livid. I administered about a tablespoonful of brandy, and three or four glasses of wine. I examined the pupils; they were much contracted. I endeavoured to converse with her, and was enabled in some degree to do so after she had wine. I at first thought that she was in a state of collapse, which would terminate in death. The good effect of the wine suggested hope. I asked how much of the liniment had been used, and was shown the bottle, which might contain one or two teaspoonfuls out of the twelve. Knowing the extreme sensibility of the Dallett family to medicine of every description, it occurred to me, *as just possible*, that the stupor and collapse might have arisen from absorption of the opium of the liniment. I had never heard of so small a quantity of laudanum, when so applied, producing such an effect. I thought it my duty, under all the circumstances, to hazard the imputation of having used improper and dangerous medicine. The only thing which gave the diseased a chance of life, was to take this view of the case, and act on it. I used every exertion to rouse her, by sinapisms, hot water and mustard to the feet, &c. I now treated the symptoms exactly as I would have treated narcotism from opium. I explained my treatment to the family, as the exertions to rouse the deceased might otherwise have appeared extraordinary. No improvement showed itself. I desired my assistant, who was in attendance with me, to call in Dr. Wane and Mr. Shillito. Both gentlemen co-operated with me in pursuing the same line of treatment, until death took place. Just before Dr. Wane arrived, I gave twenty grains of sulphate of zinc; it did not act, and he suggested a repetition of the dose, and tickling the fauces. We used the emetics with reference to the symptoms; and not with reference to my prescriptions. We all co-operated in using the same treatment, till deceased expired between eight and nine A. M. On Wednesday morning, about twenty-three hours from the time at which I was first called in.

By the Coroner.—What was the cause of death?—That question cannot be answered till we have had an anatomical inspection of the dead body.

For this purpose the inquest was adjourned to Wednesday, the 14th instant, at ten A.M.

Emma Peto, servant to Mr. Dallett.—I went to Dr. Cormack's dispensary to fetch medicine, and received two bottles from his assistant. I subsequently received another bottle, and afterwards three pills, which I saw the assistant make up. The label on the pills was one to be taken every night; but as he told me one was to be taken every hour, I returned to him with the pills, and he changed the label according to his verbal directions.

Daniel Wane, M.D.—I reside at Putney. On Wednesday, the 7th instant, was called in to Mr. Dallett's a little before seven o'clock in the morning. I found Miss Dallett (the deceased) sitting on a chair in a state of stupor.

Dr. Cormack told me that she was probably labouring under narcotism; that the quantity of medicine that had been administered was very small to produce such an effect. I co-operated with him in his treatment on his representations and suggested an additional emetic of twenty grains of sulphate of zinc, having been informed that a similar one had been previously administered. Neither of these emetics took effect. From what I was told, I conceived the treatment to be the best that could be adopted. The symptoms were such as might have arisen from an administration of opium. There was a large mustard application to the abdomen. Strong coffee was given to her; she was loudly spoken to, and moved about the room. Every other means was adopted to rouse her. After the death, Dr. Cormack spoke of cholera. I have conducted the *post mortem* examination in the presence of Mr. Shillito, Dr. Cormack, Dr. Willis, Dr. Shillito, Mr. Bushel, Mr. Thompson, and Mr. Farmer, and the nurse.

A detailed report of the examination having been read, the witness proceeded—

From the appearances above described I am of opinion that the cause of death arose from peritonitis and *inflammation and ulceration of the mucous membrane of the bowels* and *congestion of the brain;* these were most probably occasioned by fever.—(The Coroner here read the evidence of Dr. Cormack, in reference to the whole case.) Under the condition of peritonitis and inflammation of the bowels, the use of opium was most judicious. It is a general mode of treatment in such a case. There was certainly not more than a proper quantity of opium used. I am satisfied, from the facts of the case, that the death was not, in any manner, occasioned by the opium. I do not conceive that the liniment produced the stupor. I think the treatment was judicious, and such as a skilful person, with an adequate knowledge of his profession, would adopt. It was not a rash treatment; it was a cautious exhibition of opium. In his statement, Dr. Cormack said he believed it to be a case of fever, and the appearances have corroborated that opinion. I think the opiate treatment undoubtedly judicious in that state of abdominal affection. I think the congestion of the brain was an associated condition with the abdominal inflammation. I should not have looked for inflammation of the brain more than congestion. I am certain that the medicines had from Mr. Farmer could not have produced the appearances. Those medicines, as described, were not dangerous, or in any way tend to cause death, they are mild medicines, and by no means improper. I am perfectly satisfied that the death was natural, and occasioned by the causes I have before mentioned.

Charles Shillito, jun., and *Robert Willis, M.D.*, fully agreed with Dr. Wane as to the cause of the death.

The *Coroner* briefly charged the jury, stating that there were two questions for their consideration—first, whether the deceased died from natural causes, or whether her death was in any manner occasioned by the treatment adopted; and if the latter, secondly, whether Dr. Cormack's treatment was such as a medical gentleman, acting with due caution and without culpable rashness, would have adopted.

The Jury, after a brief consultation, unanimously found—

"That the deceased died a natural death from peritonitis; and we are of opinion that the treatment of Dr. Cormack was skilful, judicious, and proper, and such as a medical gentleman with an adequate knowledge of his profession would have adopted."

TO CORRESPONDENTS.

S. R. A.—(1.) We cannot explain why ginger beer is affected by thunder. —(2.) When sulphuric acid and water are mixed, chemical combination and contraction of volume take place, both of which occasion the development of heat.—(3). When Rochelle salt is dissolved in water, the former undergoes a change of state from the solid to the liquid, and this is accompanied by a reduction of temperature, in consequence of free caloric becoming latent.

R. T., M.P.S. wishes to be informed whether any apparatus is sold for making coal-gas on the small scale, for use in places where there are no gas works.—[We do not know of any such apparatus being kept made, but there would be no difficulty in having a small apparatus fitted up for the purpose.]

W. B., A.P.S.—(1). We doubt the fact.—(2). *Orangeade powder* may be made with white sugar, tartaric acid, and essences of lemon and orange peel.

W. H. Jun.—The best way to make a *lilac colour* for a show-bottle, is to add carbonate of ammonia to solution of nitrate of cobalt, until the precipitate first formed is re-dissolved, and adding a little ammonia-sulphate of copper, if necessary, to produce the desired tint.

W. T. C. will find the required formula for *Indelible Ink for writing on Zinc*, in *Gray's Supplement.* The best is a weak solution of chloride of platinum in water, about 5 gr. to ℥j of water.

E. G. I.—We see no reason to doubt its genuineness.

M. P. S. (*Plymouth*)—We know of no such formula.

Medicus.—Yes, *Lindley's Synopsis of the British Flora.*

Amator Scientiæ and *W. L. P.*, are referred to *Noad's Lectures on Electricity.*

W. M.—Silicate of soda is made by fusing sand and carbonate of soda together.—(2). We suppose by *aluminate of soda* is meant the solution of moist hydrate of alumina in caustic soda.—(3.) We know of no work of the kind,

L.—A dilute solution of lactic or acetic acid, may be substituted for common rennet.

We have received the following communication from *Mr. Samuel Manthorpe* of Colchester :—

"Sir,—I take the liberty of sending you the result of a meeting of all the Chemists and Druggists of Colchester upon the subject of shortening the hours of business.

"We had previously closed our shops, but not our doors, at eight o'clock; we had also formed ourselves into a Local Society, and established a permanent Book Club; our Library now numbers 124 volumes of the best works upon Chemistry, &c. Of these things honourable mention has been made in the *Pharmaceutical Journal*, and towards the latter object a grant has been received from our parent society. Last Tuesday we proposed and carried unanimously resolutions, of which the accompanying notice to the public will explain the intention. Judging by the past, I doubt not we shall carry out this new evidence of our unanimity to the spirit as well as the letter."

[The resolution is to the effect that on and after the 26th of July, the shops will be closed at 9 o'clock every night, excepting on market days.]

G. N. suggests, as a means of increasing the Benevolent Fund of the Society, that the Members should give the profits of all the business done on Sundays to that object.

A Correspondent from Sheffield states, that the respectable Chemists and Druggists there, agreed to close their shops this summer at eight o'clock; but that after two or three weeks, first one and then another, broke the rule, asserting their right to close when they pleased, and that in consequence of this, the attempt to introduce early closing has proved, in great measure, a failure.

Mr. Cornish.—The Pharmacopœia of 1809 contains the best formula for Vinum ferri, which is a follows:—Iron Filings, ℥ij.; Sherry, f℥xxxij, set aside for a month and filter.—The dose is from a drachm to four drachms, or more. In the Pharmacopœia of 1824, it was modified thus:—Iron Filings, ℥j.; Supertartrate of Potash, ℥vj.;—Mix, keep moist, and stir daily for six weeks. Dry and powder, then add Water, Oiss.; Proof Spirit, Oj. The latter is a bad preparation, being liable to rapid decomposition.

Antiquackery should consult a respectable medical practitioner.

M.P.S. (*Bolton*).—The recent edition of Gray's *Supplement* contains instructions for making pickles; which is a subject not exactly adapted to this journal.

An Apprentice (*Strand*).—The classical examination of apprentices is a lenient one at present. The candidate must show that he is sufficiently acquainted with Latin to read prescriptions.

S. S. V.—(1.) An alteration was made to remove the objection complained of.—(2.) In making tinctures the Pharmacopœia directs that a definite quantity of spirit should be used, no allowance is made for the portion retained by the ingredients after pressure, and we are not directed to make up the quantity.—(3.) In making Pil. Styracis Co. the storax must be strained to separate impurities.—(4.) It is most common to use Creta Preparata in Mistura Cretæ. We are not aware of any objection to the use of Creta Precipitata.

J. J. J.—Apprentices registered in 1847 enjoy the same privileges as those who joined the Society before the date of the charter, namely, they pay the same subscription—the same fees on attending lectures—have admission to the Library and Museum, and receive the Journal. The additional privilege which they enjoy is that of passing an examination when they become Associates or Members, which gives them a superior qualification. The subscription of an Apprentice or an Associate is half a guinea.

Death from Morison's Pills.—A Correspondent has sent us a report of an inquest on the body of a victim to Morison, who took in one day 132 pills, having previously on several days taken fifty pills each day. She died with the usual symptoms, ulceration of the intestines, with discharge of blood.

Juvenis, A.S.—(1.) Ask Mr. Hooper.—(2.) It is not usual to add "oil of tartar" to cold cream, and would not be an improvement—(3.) Probably spirit would remove the stain.—(4.) When caustic is applied to the bites of animals, it may be used in substance or a strong solution, ℥j to the ℥j.

J. H. F. has sent us a specimen of a disreputable handbill from Woolwich.

Webb's Pulna Water.—Erratum. In the Advertisement last month on the cover, the word "*Pulna*" was spelt "*Pulwa.*"

Advertisements to Mr. Churchill, Princes Street, Soho.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. III.—SEPTEMBER 1st, 1847.

THE PROGRESS OF PHARMACY IN GREAT BRITAIN.

No impartial person can review the proceedings of the Chemists and Druggists, during the last few years, without feeling sensible that Pharmacy has made considerable progress in this country during that period. Notwithstanding the difficulties which attended the commencement of the undertaking—in spite of the gloomy forbodings of the indifferent, and the opposition of the disaffected, the scientific and educational objects of the Pharmaceutical Society have proceeded without interruption. The education of the Pharmaceutical Chemist has been defined, the practical working of the system, including the examination, has been tested, and the necessity of its adoption is generally acknowledged. The fame of the institution has spread throughout Europe as well as on the other side of the Atlantic. One of the candidates, who recently passed the major examination, came from the Mauritius on purpose to study in the laboratory in Bloomsbury Square, and obtain the diploma, being prohibited by a recent law from practising Pharmacy in his own country without a qualification. We have also had students from Portugal, Demerara, Syria, and other countries where a diploma is required. Everything which could be effected by a voluntary society has been done to promote the scientific advancement of the rising generation of Chemists.

The public being interested in the accomplishment of this object, it would appear to be the province of the Government to undertake it, and we believe Great Britain is the only nation in Europe in which the Government has hitherto neglected this duty. It may be considered, however, a favourable circumstance that the movement has emanated from the Chemists themselves, for while it is desirable that a proper discipline should be introduced, it is equally important to maintain the principle of self-government, and we are now in a position to appeal to facts and past experience in support of our claim to this privilege. Although the unusual pressure of business in the House of Commons, during the late session, prevented the introduction of a Bill to regulate Pharmacy, there is every reason to believe that the subject will meet with due attention during the approaching session.

Our readers will perceive, from the observations of Professor

Rose in another part of this Journal (page 116), that the proceedings of the Pharmaceutical Society have been observed with no little interest by our brethren in Germany, and that much importance is attached to the progress which has been made in reference to education. Our credit, therefore, is at stake, not only in this country, but in other nations in Europe, where our position is known, and our prospects are considered in a favourable light. The Chemists in Germany who have hitherto looked down upon us as an uneducated and unprotected class of persons, are now beginning rather to envy our position, and to anticipate an important revolution in our favour. Whether these anticipations will be realised or not, will depend in a great measure on our own stedfastness and determination in the completion of what we have commenced ; for it is obvious that, until we have obtained an Act of Parliament, the work is only half done. The strong expression of opinion on this point by Professor Rose, ought to stimulate us to persevere, and to waive all minor differences in the endeavour to accomplish the ultimate object which is so much to be desired. It forms a striking contrast to the animadversions alluded to in our remarks at the head of his paper.

There are in the world many troubled spirits who are constantly grumbling. They have neither the talent to originate, nor the industry to promote any useful enterprise, but are always ready to obstruct and oppose the undertakings of others. They may be compared to rats, a class of animal possessing no genius in architecture, but clever in undermining and destroying edifices—which being done, they run away. In every parish, in every club or society, and even in the House of Commons, persons of this class may be met with, whose chief talent consists in finding fault. They look on in idleness while others cultivate the vineyard, and then complain that the grapes are sour.

To a certain extent opposition is desirable ; for no human beings are fit to be intrusted with unlimited power, and all governing bodies, unless kept in check by a due sense of their responsibility, are liable to neglect their duty and abuse the trust reposed in them. However various, therefore, may be the motives of their opponents, the tendency of their proceedings is beneficial, as a wholesome restraint upon the parties in office. Those who devote their attention to the exposure of errors and the correction of abuses in a proper spirit, render an essential service to the cause of reform, and there is but little to be feared from malcontents, who raise an opposition for the sake of notoriety, or to gratify a morbid perverseness, as they enjoy only an ephemeral triumph by merely retarding what they are unable to frustrate.

It would have been a remarkable circumstance if the Pharmaceutical Society had been exempted from those casualities to

which all other institutions are exposed, and we are not surprised to find that there are some persons who take a disparaging view of all that has been done, and endeavour to undermine by slander and vituperation the result of labours in which they have taken no part. The tirades of these critics occasionally appear in journals professedly favourable to the advancement of Pharmacy, but tending rather to the promotion of discontent. From the tenor of the articles alluded to, it might be supposed that those who have been exerting themselves for years in the endeavour to raise the character and position of the Chemists, by introducing an improved education, have injured their brethren, while the only true friends of the cause are those who have done nothing.

The authors of such communications prudently withhold their names, and never show their faces. They burrow under ground like moles, and imagine each molehill of their own creation to be a mountain. We have been asked why we never attack these secret foes. We ask, who are they? Are they Chemists and Druggists? If so, our only weapon is the olive-branch—for it has ever been our desire to promote harmony among all the members of our body. We may observe that some of the most zealous supporters of the PHARMACEUTICAL SOCIETY were originally opposed to it, and were not backward in expressing their sentiments. This led to a mutual explanation; the sources of dissatisfaction were cleared up; the real objects and advantages of the Association were made manifest; and those who had previously been hostile to the undertaking not only added their names to the list, but became warm advocates, and have continued to be so to the present day. If any of our Members are dissatisfied with the progress and proceedings of the Society, we should be glad to meet them in the same way, and feel confident that the same result would take place. Whatever imperfections may be found to exist we are anxious to see rectified. Our views are not limited to the object of upholding the Society, which was established as a means for attaining an end. That end is the union of all the Pharmaceutical Chemists of this country into one recognized, harmonious, and educated body, and the protection of that body by legislative enactment. We see no reason why the PHARMACEUTICAL SOCIETY should not be extended and made available for this purpose. Let those who think otherwise suggest a better mode of effecting the object in view. In the absence of any such suggestion, we call upon all our Members to exert themselves in extending the influence of the Society, in anticipation of the approaching session of Parliament. The motive which existed six years ago exists now with much greater force, for most of the obstacles, which at that time beset us, have been overcome, and our next step is to reap the harvest.

THE FIFTH SESSION OF THE SCHOOL OF PHARMACY.

In anticipation of the opening of the session, which will take place next month, the state and prospects of the School of Pharmacy have engaged the serious attention of the Council, and endeavours have been made, as on previous occasions, to afford to the students as great an inducement as possible to avail themselves of the instruction afforded. In the appointment of lecturers the Council have always considered themselves fortunate in being able to secure the services of professors of the first eminence in their respective departments, and the experience of four years has placed the Society in possession of every facility for illustration by means of an extensive supply of apparatus and diagrams.

The time of the day at which the lectures are delivered has also been reconsidered, and the Council have decided not to make any alteration in this respect, believing that half-past eight in the morning is the most convenient hour for the majority. In the autumn of 1843, a notice was inserted in this Journal, at the request of some Associates of the Society, proposing an evening course of lectures, provided a sufficient number of students to form a class would forward their names to the Secretary. No more than three responded to this proposition, consequently the idea was abandoned. The only parties who have spoken at all disparagingly of the School of Pharmacy, are persons who for certain reasons not openly avowed, though clumsily concealed, are opposed to the Pharmaceutical Society altogether. They are not in any way connected or identified with the body of Chemists and Druggists, excepting through the medium of a scurrilous publication.

It is a source of much regret that it has been found necessary to make an alteration this year in the lectures on Chemistry and Pharmacy, on account of the indisposition of Professor Fownes, who is advised, for the present, to discontinue his labours, and leave town for the benefit of his health. As the classes have not hitherto been so numerous as might have been expected, and the expense of the school, arising from this circumstance, has been a source of complaint, some retrenchment has been thought advisable, and during his unavoidable absence, an arrangement has been made for amalgamating the lectures on Chemistry and Pharmacy into one course, which will be delivered by Mr. Redwood. This will not materially, if at all, diminish the total amount of instruction afforded; the two subjects being so intimately connected, that in treating them separately it was necessary for both the Professors frequently to go over nearly the same ground. This repetition will now be avoided by the union of the two subjects into one course, by

which means, as well as some other retrenchment which has been effected, the total expense of the School will be about half the former amount, even with the same attendance.

But we trust also that the pressure on the funds of the Society will be further diminished by the accession of a larger number of students, as well as by the slight increase in the fee for attendance, which has been found necessary. While Chemists, who have been for many years in business, are using every exertion to secure to the rising generation advantages which they did not themselves enjoy in their younger days, the good sense of those for whose especial benefit the school has been established, should induce them to embrace eagerly the opportunities of improvement thus afforded.

When an Act of Parliament is passed, requiring all future Pharmaceutical Chemists to qualify themselves and pass an examination, the value of a School of Pharmacy will, we presume, be more generally felt than it is at present. In the mean time the success, and even the continuance of the school, is dependent on the voluntary attendance of those students who are able to appreciate the advantages of mental cultivation as a means of promoting their success through life.

It should also be recollected that the attendance of Lectures forms a part only of the means by which a proper qualification is to be obtained. This must be followed up by reading and private study, to fix on the mind the impression made by the oral instruction. Even without lectures, considerable proficiency may be obtained by means of books and experiments at home by young men of studious habits; but without the illustrations of the lecture-room, and the aid of a teacher, much time is generally lost for want of a proper method of study and judicious selection of books, and the knowledge acquired is obtained at the expense of much unnecessary labour. We therefore recommend the lectures as a most valuable and important auxiliary to private study, observing, that among the students in past sessions, some of the most punctual and regular in their attendance resided at a distance of five or six miles from the school.

The attendance of the practical class in the laboratory, has hitherto been so creditable, and the result so satisfactory, that we look forward with confidence to the continued prosperity of this branch of the establishment.

THE LATE INQUEST AT PUTNEY.

We regret the necessity of reverting to this unfortunate occurrence at Putney, but Dr. Cormack having taken umbrage at the observations in our last number (page 54), some explanation appears to be required.

It should be remarked, that we did not presume to offer any opinion respecting the medical treatment resorted to by Dr. Cormack, this not being within our province. Our sole object was to answer the article contained in the *Lancet* of July 24th ; for this purpose we gave what we believed to be a plain statement of facts.

Dr. Cormack denies having prescribed an aperient on his first visit ; and we find, on further inquiry, that it was not on his first visit, but on the afternoon of the same day. The circumstance was mentioned not as a reflection on Dr. Cormack, but as a refutation of the assertion in the *Lancet*, that the former aperients furnished by Mr. Farmer were like "a razor in the hand of a suicide," for if these had done mischief, a repetition of aperient medicine would surely have been avoided.*

Dr. Cormack considers it unjustifiable to express a hope that his assistant did not make a mistake in the quantity of opium, on the plea that this is an insinuation that he did make a mistake. This we conceive to be jumping at a conclusion : the observation merely implies that such an occurrence was *possible*, which cannot be denied.

In his own evidence, Dr. Cormack states, "I thought it my duty, under all the circumstances, to hazard the imputation of having used improper and dangerous medicine. The only thing which gave the deceased a chance of life, was to take this view of the case, and act on it." Assuming this view of the case to be correct, who administered the opiate? Did the doctor use "improper and dangerous medicine," or was his assistant responsible ? Between the horns of this dilemma can it be a libel on the doctor to hope that his assistant had not inadvertently mistaken the quantity ? Supposing the doctor's "view of the case" to be erroneous, was his treatment proper ?—he states in evidence that he "treated the symptoms exactly as he would have treated narcotism from opium." We offer no opinion on this point, but appeal to the published report (page 93) and denounce the attempt under such circumstances to throw the blame on the Chemist. This attempt having been made, and the *Lancet* containing the

* We presume that at the time of prescribing the aperient, Dr. Cormack was aware of the nature of the medicine which had been already taken. To suppose the reverse would imply a censure on the doctor, as Mr. Farmer's shop was "over the way," and the information could be obtained in less than five minutes.

unjust attack having been in circulation in the neighbourhood, it was our duty to place all the facts before the public, a duty which we shall never shrink from performing in any similar case, whatever may be the personal responsibility incurred by so doing.

Dr. Cormack indignantly denies ever having given advice for a shilling, and declares that he has never been in the habit of "underselling his professional brethren." While we insert this statement on his authority, we beg to observe, that giving advice for a shilling is not, in our opinion, underselling his professional brethren, as it is customary for medical men who keep open shops, to furnish medicine, including advice, across the counter for a few pence. We impute no blame to a doctor for embarking in trade. It is optional and may be convenient. But while he is pocketting the pence he can scarcely stand upon the dignity of his "M.D." Instead of threatening us with an action for libel, Dr. Cormack ought rather to give us a vote of thanks for advertising his shop.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS,

ASSOCIATES, AND APPRENTICES (*continued*).

Elected August, 1847.

MEMBERS.

Alford	Draper, Thomas, Market Place
Castle Donington .	Farmer, James, Borough Street
East Indies . . .	Sparks, John, Bombay
London	Cope, Ricardo, Battersea
Maidstone	Dingley, Richard L., Week Street
Torpoint	Down, Richard H., Fore Street
Ventnor	Maitland, Alexander, Isle of Wight

MAJOR EXAMINATION.

Mailloux, Joseph	Port Louis, Mauritius

MINOR EXAMINATIONS.

Huskisson, William . . .	13, Penton Place, Pentonville
Smith, John	Portsmouth

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Baly, George . .	Mr. Baly	Warwick
Hardy, Charles .	Mr. Wylde	Manchester
Harris, Wm. R. .	Messrs. Fowke and Son	Stafford
Rigby, James I. .	Mr. Smith	Sutton Coldfield
Sheasby, Thomas	Messrs. Fowke and Son	Stafford
Simpkin, John W.	Messrs. Bell and Co. .	Leeds

Erratum.—In our last Number, page 55, *for* John Ritson, Manchester, *read* Joseph L. Ritson.

ORIGINAL AND EXTRACTED ARTICLES.

ON RECENT ADULTERATIONS OF OPIUM.

BY EDWARD SOLLY, F. R. S., &c.

In the observations on opium, in the last Number of the *Pharmaceutical Journal*, by M. Batka (page 81), there is a description of an "artificial opium-like product" in the author's possession, which he received under the name of *Dikki malei*, and which he evidently regards as a spurious variety of opium. As in forming this conclusion he has probably been misled, it is perhaps worth while to point out the real nature of the substance to which he refers. *Dikki malei* or *dik-millei* (duk) the *cumbi pisin* or cumbi gum of Hindostan, is a resin which exudes from the young shoots and flower buds of the *Gardenia lucida* (Roxb.) a beautiful shrub growing wild near Bombay, and occasionally cultivated in the gardens of the Deccan. It is described by Ainslie in his *Materia Medica*, ii. 89, as "a gum resin, not unlike myrrh in appearance; and possessing, the Hakums say, nearly similar virtues; it is, however, far more active, and ought on that account to be administered in very small doses: as an external application it is employed dissolved in spirits for cleaning foul ulcers," &c. I received specimens of this substance in 1839, from Dr. Babington, and on examination found it to consist of 83 parts of a yellowish-brown resin, sp. g. 1.1199; hard at common temperatures, and becoming soft at 90°; and 17 parts of vegetable and earthy impurities, chiefly consisting of buds and leaf scales. Ainslie states that he had in vain endeavoured to ascertain whence this substance was brought, and the plant from which it was procured. I was indebted to Dr. L. Luish, of Bombay, for the information that it is procured from the Gardenia.

33, *Bedford Place, August* 14, 1847.

ON THE ACTION OF VOLATILE OILS ON THE SULPHATES IN AN AQUEOUS MENSTRUUM.

BY MR. WILLIAM BASTICK.

In making some experiments in reference to the best method of preserving the aromatic distilled waters of the Pharmacopœia, I was induced to try the results arising from a mixture of volatile oils with water, obtained from a spring, containing a considerable quantity of sulphate of lime, and other salts in solution, but no organic matter, and having neither acid nor alkaline reaction.

The various oils were mixed with different portions of water, and kept in bottles in a moderately warm place for about two months. At the end of that time the waters were examined, and found to be saturated with sulphuretted hydrogen, the presence of which was readily ascertained by the smell, and by precipitation of the metallic bases usually adopted for that purpose.

On removing the sulphuretted hydrogen by precipitation with a metallic salt, the whole of the volatile oils were found to have disappeared; no trace of them could be discovered by the taste or smell; and on examining the waters for sulphuric acid, by means of muriate of barytes, no precipitate could be obtained but what was soluble in nitric acid, clearly showing the entire decomposition of the sulphates in the original water. After boiling the waters to free them from sulphuretted hydrogen they were found to possess an alkaline reaction, and to evolve carbonic acid on the addition of an acid.

The waters had not become mucilaginous, as is usually the case when decomposed, but to the eye preserved the same appearance as when first prepared.

In fact, the metamorphoses appear to have been brought about by the mutual reaction of the elements of the sulphuric acid, of the salts, and the volatile oils. The sulphur of the sulphates, forming with the hydrogen of the oils, sulphuretted hydrogen, and the carbon of the volatile oil combining with the oxygen of the sulphuric acid, producing partially, if not wholly, carbonates of the bases with which that acid was previously combined.

It is quite evident that the only source of sulphur must have been the sulphates, as the water originally contained no trace of sulphuretted hydrogen, and the volatile oils used were such as peppermint, dillseed, &c., and are composed only of carbon, hydrogen, and oxygen.

I will take this opportunity to observe that the remarks of Mr. Warington upon distilled aromatic water, published in this Journal are fully borne out by my own experience, as to the inutility of the spirit directed to be used by the Pharmacopœia in

their preparation, and to the still worse method of preparing them extemporaneously by means of carbonate of magnesia. The simplest and best plan of obtaining quickly the distilled waters used in Pharmacy, is by merely agitating the volatile oils with distilled water in such proportions only as the water will take up. The quantities of volatile oils ordered by the Pharmacopœia are in excess, but by the methods there prescribed the excess is removed in the processes of filtration or distillation.

ON REMOVING STAINS FROM LINEN.

BY MESSRS. T. AND H. SMITH.

We lately had occasion to remove some marks from linen which had been damaged by writing on it with "Marking Ink without Preparation," now so much in use. In writing with this ink, to bring out the characters, the application of a sharp heat is required, and in this case, the necessary heat was obtained by the use of a hot iron.

The usual means, such as cyanuret of potassium, Dr. Herapath's mode (see vol. vi., page 476) of forming an iodide of silver by means of tincture of iodine, and subsequent removal of this by hyposulphite of soda; as well as others which need not here be mentioned, proved quite ineffectual in making any impression on the marks. We at first thought that their obstinate resistance to the means of erasure employed, might have arisen from the texture of the cloth having been carbonized by the action of some corrosive acid entering, through faulty preparation, into the constitution of the marking-ink. In this we afterwards found ourselves mistaken. These stains, although by the action of heat rendered so difficult to remove, may, as we found on trial, be very easily, speedily, effectually, and without the slightest danger of damaging the most delicate fabric, effaced by wetting the stains with the common solution of chloride of lime. In the course of a few minutes these pass from black to white, in consequence of the formation of the white chloride of silver, but as this would soon again blacken by the action of light, it must be dissolved and washed entirely away. In consequence of the ready solubility of the chloride in solution of ammonia, or hyposulphite of soda, this operation can fortunately be done without the least difficulty, by dipping the part of the cloth covered with the now white marks into either of these solvents, and then, after a few minutes, rinsing thoroughly in clean water.*

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* When the marks penetrate deeply, the space of a few minutes is too short for the complete conversion of the silver into chloride; a crust of this insoluble compound being formed on the surface. The interior portions are apparently in this way protected from the further action of the solution.

By this simple and easy process, the marks may be entirely removed in a few minutes. This plan, so far as we are aware, has now been proposed for the first time, but whether this be the case or not, it is so much superior to any other known to us, that we believe you will do a service to your numerous readers by giving it a place in your Journal.

Edinburgh, 21, *Duke Street*,
14*th August*, 1847.

[The above method, although original on the part of Messrs. Smith, was mentioned by Mr. Burgess in his paper, vol. i., p. 314.—Ed.]

CHLORIDE OF ZINC, AS A DISINFECTANT, &c.

SIR W. BURNETT'S PATENT.

Since the publication of the article on the above subject, which appeared in the last number of this Journal, we have received a pamphlet from the proprietors of the patent, containing the testimonials, which have been furnished by a great number of persons, as to the efficacy of chloride of zinc in its several applications.

The purposes for which it is recommended to be applied are,

1. *The preservation of timber, hop-poles, &c., from decay.*
2. *The protection of wood from fire.*
3. *The preservation of canvas, cordage, woollen, &c., from decay.*
4. *The protection of woollen, &c. from moths.*
5. *The preservation of animal matter.*
6. *The disinfection of putrescent substances.*
7. *The purification of bilge water, cesspools, &c.*

With reference to the first of the above applications there are favourable testimonials from Graham, Brande, and Cooper, as chemists, and from a great number of practical men, who have employed the solution.

With reference to the second application, the testimonials are not so strong. It appears that soft woods, such as yellow pine and other deals, after having been saturated with the solution of

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Even after continued action for an hour or two, the conversion is not complete. The entire destruction of that part of the fabric corresponding to the marks may ensue before this desired point shall have been reached. In these cases, the plan we have already recommended should be followed, and should the marks, after the action of the ammonia, not then be entirely obliterated, a repetition of the process will invariably succeed in removing these, without even a trace of their previous eixstence being left behind.

chloride of zinc, do not readily ignite; but that the same effects are not produced, in the same degree, upon hard woods.

With reference to the third and fourth applications, the testimonials are of a very satisfactory nature.

In the fifth application, also, it appears to have answered well, as testified by Messrs. Bowman, Sharpey, Pettigrew, Partridge, &c., who state that they have employed it with complete success, for the preservation of subjects for dissection, and for the more prolonged preservation of animal substances as specimens. They state also, that it possesses a great advantage over some other solutions that have been recommended for a similar purpose, inasmuch as no injurious action on the knives and other steel instruments, employed by the anatomist, results from its use.

Some of the Surgeons above-named, and especially Mr. Sharpey, speak favourably of the effect of the solution, not only in checking the putrefaction of animal substances, but also in correcting offensive smells arising from putrescent matter; and, we presume, on this evidence, the patentees recommend it for the 5th application.

With reference to its use for this purpose, however, a controversy appears to be taking place between the proprietors of this and the rival disinfectant—Ledoyen's disinfecting fluid. We have received some papers for publication from these parties, among which is one by Professor Calvert, of Manchester, of which the following is an extract, embodying the material points:—

This salt is not susceptible of crystallization, is very soluble in water, but has no striking properties.

No attention was paid to this salt until within two or three years, when it was applied by a Mr. Sucquet as an antiseptic, but not as a disinfecting agent, for which purpose it is improperly proposed to be used in this country, for most likely Mr. Sucquet was acquainted with some of the facts I am about to explain.

It is a bad disinfecter, because sulphuretted hydrogen has no action on salts of zinc, which are acid; therefore, when the neutral chloride of zinc shall have been partially acted on by hydrosulphuric acid, an acid salt will be produced, on which sulphuretted hydrogen will have no action, and, in consequence, must escape; and further, the salt being acid, will act in the following manner on the hydrosulphuret of ammonia which may exist, whilst a neutral salt will be produced by a part of the ammonia, torrents of sulphuretted hydrogen will be given off. The same explanations are applicable to the removal of noxious effluvia from confined atmospheres. Having tried the same bulk of night-soil with this fluid and Mr. Ledoyen's, the most striking differences were perceptible. In the case of Mr. Ledoyen's, the disinfection was instantaneous, and in the other not.

The chemical reasons for the non-employment of salts of zinc in the disinfection of night-soil, as regards agriculture, are, that all of them (except-

ing the carbonates which are even soluble in ammonia) are soluble. The only insoluble salt that could be produced in this case, would be the sulphuret which, by the oxidation of the atmosphere, would be quickly transformed into sulphate, and in consequence, all the bulk of the salts of zinc employed to disinfect a cesspool becoming soluble, would act as poison on vegetation. You are well aware that in the case of Mr. Ledoyen's fluid, in addition to the production of one of the most active agents of vegetation, all the compounds formed are insoluble, and will continue so. To substantiate my opinion, I may mention that in 1842 Mr. Livol published a paper on the action of different metallic salts on vegetation, and these are his words relative to the salts of zinc: "Plants were watered with sulphate of zinc; twenty-four hours, after the leaves became yellow, withered, and folded up. The leaves and the plants contained a large amount of salts of zinc, which could be extracted from them by water."

It is not the first time that attempts have been made to apply the salts of zinc to the purpose of disinfection, for in the year 1839, a Mr. Siret of Paris took out a patent for disinfecting with a mixture in which sulphate of zinc was the principal ingredient. The failure of this means when applied to night-soils, was owing to its injurious effects on vegetation.

A reply has been written to this by Mr. Glass, dated from Sir W. Burnett's Works, Millwall, the object of which is to show that the objections urged by Mr. Calvert against the use of chloride of zinc as a disinfecting agent, are unfounded.

We think, however, that Mr. Calvert's statement as above, with the exception of the two first sentences, remains uncontroverted.

Mr. Glass says,

Professor Calvert seems to me to be desirous of conveying the idea, that Sir William Burnett's solution is an antiseptic, but not a disinfectant; and that M. Ledoyen's fluid is a disinfectant, but not an antiseptic.

If we look to the action of chloride of zinc upon sulphuretted hydrogen and hydrosulphate of ammonia (the odourous compounds supposed to be evolved from putrefying animal and vegetable substances), we find that it is perfectly analogous to that of nitrate of lead, thus:

With Chloride of Zinc,	*With Nitrate of Lead,*
Sulphuretted hydrogen produces sulphuret of zinc and hydrochloric acid.	Sulphuretted hydrogen produces sulphuret of lead and nitric acid.
Hydrosulphate of ammonia produces sulphuret of zinc and hydrochlorate of ammonia.	Hydrosulphate of ammonia produces sulphuret of lead and nitrate of ammonia.

The products possess the same properties as to solubility and freedom from odour.

This method of stating the case conveys an erroneous impression, and would mislead any one unacquainted with the subject. It ought to have been stated as follows:—

Chloride of Zinc.

If neutral chloride of zinc be treated with sulphuretted hydrogen, a very small portion of the salt will undergo decomposition, yielding with the elements of the gas sulphuret of zinc and hydrochloric acid.

The hydrochloric acid thus formed, rendering the remaining solution acid, no further decomposition of the salt will take place.

Nitrate of Lead.

If nitrate of lead be treated with sulphuretted hydrogen, a decomposition of the salt will ensue, sulphuret of lead and water being formed, and nitric acid set free.

As salts of lead are decomposed in the presence of free acid, the decomposition will continue as long as any nitrate of lead remains.

Mr. Glass proceeds as follows :—

It is affirmed, that chloride of zinc is "an imperfect disinfecter of night soils, and unfits them for future employment as manure."

"*It is a bad disinfecter,*" Professor Calvert says, 1*st*—"*Because sulphuretted hydrogen has no action on salts of zinc, which are acid.*"

The answer is, that Sir William Burnett's solution of chloride of zinc is not acid. It is neutral. Professor Calvert endeavours to get rid of the neutrality of the zinc salt in a singular manner. He supposes a stream of sulphuretted hydrogen (hydrosulphuric acid, as he calls it in this case) to be passed through the zinc salt, and then he says it is acid ; or he supposes sulphuretted hydrogen acts its part first upon chloride of zinc in a mixture containing hydrosulphate of ammonia, rendering the zinc salt acid, which will then act on the hydrosulphate of ammonia, and evolve sulphuretted hydrogen in torrents.

That sulphuretted hydrogen has no action upon an *acid salt* of zinc, and that an *acid salt* of zinc will evolve sulphuretted hydrogen from hydrosulphate of ammonia, there can be no question ; but Sir William Burnett's solution is neutral, and therefore decomposable by sulphuretted hydrogen, or hydrosulphate of ammonia, as I have already illustrated.

I do not affirm that sulphuretted hydrogen will completely decompose the zinc salt, but hydrosulphate of ammonia will, and that is the odorous compound we have principally to do with in night soil.

We think there can be no doubt that while of the two substances in question, chloride of zinc is the only efficient antiseptic and preservative agent, so nitrate of lead is much the more efficient agent in the decomposition of noxious effluvia, in which sulphur is a constituent.

M. LEDOYEN'S DISINFECTING FLUID.

In an article published in the last number of this Journal, on the above subject, we expressed our intention, which we now proceed to put into effect, of giving some extracts from the official report, which has been printed by order of Parliament, containing a statement of the evidence adduced with reference to the claim made by the discoverers of the disinfecting fluid.

The claim preferred is, certainly, a very comprehensive one, being no less than that of having "*discovered* the means of disinfecting *all* fœtid animal substances and gases by a liquid which is very cheap, simple, and can be applied by any person with the greatest facility."

The properties of this liquid are further described by the discoverers, in the following terms:—

1st. "It disinfects night-soil, not destroying but increasing vegetation, more particularly as regards agriculture, *completely preventing the disease in potatoes*, when the land is manured with disinfected night-soil."

2ndly. "It disinfects hospital-wards of miasma, also cellars, water-closets, and buildings infected by impure gases."

3dly. "It disinfects sailors suffering from fever on board of vessels; it will also disinfect ships at sea and under quarantine."

4thly. "It disinfects patients suffering with infectious disorders and wounds, also dead bodies, so that they may be kept nearly a month; also different parts of the body can be kept for the purposes of dissection, for coroner's inquests, &c."

Finally. "This process is most effectual as a sanatory remedy for towns, &c."

Having submitted a statement, embodying the above description, to Lord Morpeth, First Commissioner of Her Majesty's Woods and Forests, with an application for assistance from the government to enable the discoverers to publish the secret "for the benefit of all, that this country may spread the beneficent works of the Creator, who has given by his wisdom to man this important discovery to prevent disease;" the following reply was received from the office of Woods and Forests:—

"*Office of Woods, &c., 2d February*, 1847.

"Dear Sir,—I am directed by Lord Morpeth to acquaint you that he has prevailed upon Dr. Southwood Smith, Mr. Toynbee, and Mr. Grainger, to witness and test any experiments which you may submit to them, having for their object the disinfection of dead bodies, ulcers, &c. &c.

I have, &c.,

"*To Colonel Calvert.* (Signed) R. J. Mackintosh."

This proposition was immediately acceded to by Mr. Ledoyen and Col. Calvert, and the referees appear to have entered upon the investigation of the subject, if not in the most methodical and scientific way, at least with a disposition to afford the discoverers ample opportunity for proving the efficacy of their disinfecting solution.

Numerous experiments were made to test the effect of the fluid.

1. On substances already in a state of decomposition.
2. On substances undergoing that process.
3. On night-soil.
4. On impure air.

The general conclusions deduced from these experiments are thus expressed by the referees :—

"1. That this fluid does not possess any peculiar power in preserving the dead body from decomposition, and that, therefore, it is not applicable to any considerable extent to purposes of dissection.

"2. That it removes the fœtor of putrifying substances, vegetable and animal, by decomposing the sulphuretted hydrogen upon which that fœtor chiefly depends.

"3. That it is capable of preventing the disengagement of sulphuretted hydrogen in sick chambers, and in the wards of hospitals, and of removing it in a few minutes when it is present, not merely by dissipating the smell, but by destroying the poison.

"4. That the use of it is simple and easy, and as the occasions on which it is required are of constant occurrence, and as it has the peculiar advantage of being itself inodorous, its possession would be a comfort and blessing to private families.

"5. That by decomposing the sulphuretted hydrogen, it removes from night-soil the poison which renders such matters injurious to health and dangerous to life, and by changing the ammonia from a volatile into a fixed substance, and thereby preventing its escape and loss, it preserves in the night-soil the principle which renders it chiefly valuable as a manure, while it presents that principle to the plant in a form which is known to be highly beneficial to vegetation.

"6. That, as it renders the removal of night-soil practicable without creating a nuisance, it ought, in our opinion, to be made a matter of police regulation, that no privy or cesspool should be emptied without the previous use of a sufficient quantity of it to destroy all offensive smell.

"That its most successful application to privies and cesspools is only a palliation of their evil, and does not remove the objection to their existence ; that there is and can be no safety but in the immediate removal of all excrementitious and all other refuse matters ; and that the retention of such matters in and about dwelling-houses is dangerous to health and life, and altogether unworthy of a nation which has made any progress in civilization."

Now what does this report of the referees, Dr. Southwood Smith, Mr. Grainger, and Mr. Toynbee amount to? Why, merely to this, that the disinfecting solution is capable of decomposing sulphuretted hydrogen ; and in as far as this gas is the cause of offensive odours, of destroying such odours or preventing their diffusion.

But is sulphuretted hydrogen the only fœtid gas, or even the only one generated by the decomposition of animal and vegetable matter ? Nay, further, were it proved that Ledoyen's fluid possessed the property of destroying all fœtid animal substances and gases, could it thence be inferred that it was capable of preventing contagion ?

In answer to these questions, we may quote the following very clear and sound exposition of the case, which appears to have been furnished to the referees by Dr. Leeson, Lecturer on Chemistry and Forensic Medicine at St. Thomas's Hospital.

"The decomposition of animal and vegetable substances gives rise, as it is well known, to septic or infectious miasmata. Those arising from vege-

table putrescence, generating disease and fevers of a remittent type, whilst those arising from animal matter are distinguished by a typhoid character.

"Such miasmata, although so dangerous, are not, it is believed, to be distinguished by the smell, and are most probably composed of vegetable and animal organizations so minute and subtle, as to elude the cognizance of those methods and instruments of investigation which have hitherto been employed.

"The fœtid and offensive gases or vapours consist of combinations of hydrogen with sulphur, phosphorus, nitrogen and carbon.

"The most offensive compounds are those of hydrogen with sulphur and phosphorus, forming sulphuretted hydrogen (or, as it is otherwise termed, hydro-sulphuric acid and phosphuretted hydrogen gases.)

"The ammonia resulting from the combination of hydrogen and nitrogen, although odorous, can scarcely be termed an offensive compound, but being commonly combined with sulphuretted hydrogen, it then furnishes a highly offensive substance.

"The compounds of carbon and nitrogen forming cyanogen; of cyanogen and sulphur forming sulpho-cyanogen, and of carbon and hydrogen forming light carburetted hydrogen, may be reckoned amongst the less offensive although volatile ingredients of the putrefactive vapours, but which combine to complete the farrago of unpleasant odours.

"The compounds of carbon with oxygen forming carbonic oxide and carbonic acid, although fatal to animal existence when too largely respired, can scarcely be considered as offensive compounds.

"To recapitulate: we may divide and distinguish the elements of animal and vegetable putrescent vapours thus:

Dangerous, but Inodorous.	*Odorous, but slightly offensive.*	*Most offensive.*
Remittent miasmata	Ammonia	Sulphuretted hydrogen
Typhoid miasmata	Carburetted hydrogen	Phosphuretted hydrogen
Carbonic oxide	Cyanogen	Hydro-sulphate of ammonia
Carbonic acid	Sulpho-cyanogen	

"Two methods naturally suggest themselves to the Chemist by which such dangerous and offensive compounds may be destroyed or prevented:

"First, To alter or otherwise form their component elements into new elements, which are neither dangerous, fœtid, nor offensive.

"Secondly, To fix certain of the elements so as to render the substances themselves no longer volatile, and consequently neither odorous nor offensive.

"First Method.—The principal re-agent heretofore made use of in the destruction of animal and vegetable miasmata and for the decomposition of the offensive compounds of hydrogen with phosphorus, sulphur, &c., is chlorine, the efficiency of which is dependent on its great affinity for hydrogen, with which it forms hydro-chloric, or, as it is commonly termed, muriatic acid. Unfortunately chlorine is itself an offensive, irritating, and corrosive substance, which will account for its not having been more extensively employed, although the cheap combination of chlorine and lime is applicable as a disinfecting agent, and might, it is believed, be advantageously employed.

"Second Method, by Fixation.—This method is chiefly applicable to the sulphuretted hydrogen, which may, as is well known, be decomposed by a great number of metallic salts. These salts consist of an acid in combination with the oxide of a metal. When sulphuretted hydrogen is passed through or added to a solution of one of the salts alluded to, its sulphur combines with the metal, forming an insoluble inodorous metallic sulphuret.

"The hydrogen combines with the oxygen of the metallic oxide, forming water, and the acid of the metallic salt is set free.

"With regard to the particular process of M. Ledoyen, the experiments conducted by that gentleman at St. Thomas's Hospital led to the conclusion that his process was founded on the second method before alluded to; namely, that of the fixation of the sulphuretted hydrogen by a metallic salt, and that the actual metallic salt employed was ———*.

"This opinion has been frequently verified by Mr. Ledoyen himself, who, in the most candid manner, not only admitted the composition of his fluid to be such as is here stated, but also delivered a bottle of it to Dr. Leeson for analysis and further experiment.

"In regard to its efficacy as a disinfecting agent, the general result of these experiments establish the conclusion that the efficacy of this process is confined to the removal of the unpleasant odours due to sulphuretted hydrogen and hydro-sulphate of ammonia. As the sulphuretted hydrogen is the most abundant and most offensive of the various products of animal and vegetable decomposition, it is evident that although this process cannot remove the whole of the offensive odours, it is still well suited to effect a very important and extensive amelioration of the nuisance arising therefrom.

"In regard to the application of this liquid as a dressing to putrescent sores, there can be no doubt that it will be found useful, and that it possesses several advantages over those in common use, among others, that it is itself inodorous, that it corrects the fœtid exhalations arising from sores, and that it eliminates one of the most excellent applications to gangrenous sores yet known.

"In regard to the last and most important application of the disinfecting fluid to the removal of the fœtid and offensive odours arising from privies, cesspools, night-soil, &c., it will appear from what has been already stated, that so far as the offensive effluvia result from sulphuretted hydrogen and hydrosulphate of ammonia, this liquid will totally remove them.

"The odour resulting from phosphuretted hydrogen and from the other less offensive compounds; will still remain, but as these odours are neither so offensive nor so readily diffused to a distance as the sulphuretted hydrogen, a most important and beneficial improvement will be effected, particularly in the process of removal.

"It remains to consider what benefits or injuries may result from the employment of this liquid in respect to the subsequent use of the night-soil as manure.

Two important advantages will no doubt be attained: the one, the conversion of a prejudicial and poisonous ammoniacal salt; viz. the hydrosulphate of ammonia into an inodorous and highly fertilizing compound; viz., the nitrate of ammonia. The other advantage is, that by removing that poisonous and injurious compound, thereby saving the long and offensive exposure of the night-soil to the air, which would be otherwise necessary, and which is not only disagreeable, but, by the consequent loss resulting from the volatility of the ammoniacal salts, is also injurious.

On the other hand, there is one problematical objection to the extensive applications of this fluid as a manure to land; namely, that the small quantity of the metal employed may possibly, by its accumulation, be productive of ultimate mischief; but this requires further investigation and experiment.

"The above suggestions are made without any desire to detract from the merit due to Messrs. Ledoyen and Calvert, in having thus directed public attention to the use of chemical re-agents as a means of removing a very serious and dangerous impediment to the sanatory condition of towns.

This comprises the material substance of the whole of the evidence and correspondence, which occupies forty-six folio

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* This omission occurs in the Report, as here printed.

pages of the Parliamentary paper before us. It might have been summed up in a few words to the following effect:—

We have made numerous experiments with the view of determining the effects of the liquid, called *Ledoyen's Disinfecting Fluid*, which is represented to possess the properties,

Of disinfecting water-closets, night-soil, and all fœtid animal substances and gases;

Of disinfecting sailors suffering from fever, ships at sea and under quarantine, and patients suffering from infectious disorders and wounds;

Of disinfecting hospital-wards of miasma;

Of preserving dead bodies, or parts of the body, for the purposes of dissection; and finally

Of completely preventing the disease in potatoes.

The results of our experiments have shown, that the disinfecting fluid readily effects the decomposition of sulphuretted hydrogen when brought in contact with that gas; that it has no influence on phosphuretted hydrogen, carburetted hydrogen, and other noxious gases; and that it possesses little or no antiseptic properties, and is therefore inapplicable for the preservation of animal substances from undergoing decomposition. We have obtained no evidence to show the effect of the fluid in destroying or decomposing miasma, or preventing the spread of *infectious* disease, nor has any evidence been given or obtained, sufficient to prove that the fluid has any effect in *preventing the disease in potatoes.*

Having thus failed to verify the representations of the discoverers, on the most important points, we proceeded to have an analysis of the fluid made, and find that it consists merely of a solution of nitrate of lead, in the proportions of one drachm of the salt to a fluid ounce of water.*

Instead, however, of finding in the report, anything definite or conclusive, with reference to the points in question, it is, as a whole, diffuse and unsatisfactory, containing a great number of statements which are inconsistent with each other, and much irrelevant matter, which tends only to render the subject obscure, and to leave the reader in a state of uncertainty as to the real opinions of the writers.

What, we would ask, could have been the object of introducing into the report such matter as the following?

"*London Fever Hospital, King's Cross, 12th May,* 1847.

"Mr. Sankey, the resident medical officer of the Fever Hospital, will feel obliged by Mr. Davis sending five gallons of Mr. Ledoyen's disinfecting liquid."

* This statement of the composition of the fluid is not derived from the Report, but is the result of our own analysis.

"*London Fever Hospital*, 4*th June*, 1847.

"Sir,—Will you oblige us by sending, at your earliest convenience, four gallons of Mr. Ledoyen's disinfecting fluid; also one gallon to Dr. Southwood Smith.

"I am, &c.,

"(Signed) H. H. O. SANKEY.

"*To Mr. Davis, Colonel Calvert's, Deptford.*"

"*London Fever Hospital*, 10*th June*, 1847.

"Sir,—Will you have the goodness to send to Mr. Davis, at Colonel Calvert's, Deptford, as we have unfortunately lost the address, for five gallons of your disinfecting liquid for the use of this hospital.

"I have, &c.,

"(Signed) F. BURTON, M.D.

"*To Monsr. Ledoyen*, 72, *Lombard-street.*"

No doubt Col. Calvert could say, most emphatically,—

"The happiest moment of my life (which has been a long one, near seventy years) will be when I see this fluid in general use; I only hope that all and every one that I have been engaged with in making this fluid known are satisfied that I have done it openly and honourably; it will add to the great pleasure I have in being favoured by their approbation.

"I have, &c.,

"(Signed) A. C. CALVERT."

Especially with the following testimony before him, from Dr. Carmichael, of Dublin:—

"As to its power of disinfecting contaminated places, I could not positively vouch, without an extended system of experiments fairly conducted; but I think that there is a strong presumption that it does possess this power, from the fact, that while it removes the most offensive odours, it leaves none in their place, which is the case with other purifying agents, such as the solutions of chloride of lime and soda and nitrous acid gas, *for the use of which, in ships of war, Dr. Carmichael Smith received, many years ago, from Parliament a reward of* £5,000."

We think the "discoverers" of Ledoyen's fluid are as much entitled to reward as was Dr. Carmichael Smith, whose *panacea* has, we believe, never been used since the payment of the £5,000, and is now only heard of in consequence of its insertion, as if with the object of ridicule, in some foreign formularies, under the title of *Suffumigatio Smithii*.

ON THE STATE OF PHARMACY IN ENGLAND,

AS COMPARED WITH THAT IN PRUSSIA AND GERMANY.

BY PROFESSOR HEINRICH ROSE.

[WE have received the following paper from Professor Rose for publication in this Journal. It has already appeared in one of the German periodicals*.

The opinions of this philosopher, who is equally eminent as Professor of Pharmacy, and as the first Analytical Chemist in

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* The *Medicinische Zeitung*, herausgegeben von dem Vereine für Heilkunde in Preussen, 1847, No. 16.

Europe, will be read with much interest, especially in reference to the subject of reform, which is at this time agitating the minds of the Pharmaceutists in Germany as well as in this country.

Many of our readers will recollect that at the period of Professor Rose's visit to this country, in the autumn of last year, he took much pains to make himself acquainted with all the circumstances connected with the establishment, position, and prospects of the Pharmaceutical Society, whose Laboratories and Museum he repeatedly visited, and it is satisfactory to find that, while a few discontented anonymous persons among our own body, instigated by low and unprincipled journalists, are endeavouring to frustrate the progress of improvement, and even to deter young men from availing themselves of the proffered means of instruction, we have the cordial approbation and support of this distinguished foreigner, in common with all sincere advocates for the advancement of Pharmaceutical knowledge.]

During my stay in England, in 1835, I collected several data regarding the medical establishments of that country, which, on my return home, were published in the *Medicinische Zeitung* of 1836. The paper was reprinted in Liebig's *Annalen der Pharmacie* (vol. xxi., page 327), Lindes' *Berl. Jahrb. für die Pharmacie*, vol. xxxvi, page 1, and other journals.

Although it has long been felt that a change was required in these establishments, yet I found on my short visit to England this year, that, until lately, they continued almost unaltered. A reform, however, emanating from the Apothecaries or Pharmaceutists, and the medical men, is gradually preparing, and the former in particular have become most strongly impressed with the necessity for a change.

I have already stated in my former paper, that by the term Apothecary, I do not mean to designate that class of medical men which, in England, are called *Apothecaries;* but that I apply this term to such individuals only as are called in England *Chemists and Druggists,* because it is only the latter whose vocation corresponds to that of the German *Apotheker.* It is they who dispense medicines from the prescriptions of medical men—the recipes being, as in our country, written in Latin.

The Chemists and Druggists, like our Pharmaceutists, have *Apprentices* and *Assistants*, and there is the same relation between the latter and their employers as exists among us. The *apprenticeship* is for a period of from five to six years: the premium is higher than it is among us, it amounts to from £100 to £300 sterling. The salary paid to Assistants, is frequently less than is usually paid in German pharmacies. It ranges between £20 and £50; sometimes, however, and especially in London, it is as high as £70 and even £100, nay, an Assistant, who in Germany would be called *Provisor* (foreman) is in London, in some houses, paid as much as £300. Until recently, most of the Chemists and Druggists, unlike the German Pharmaceutists, had not received any scientific education, and most of them are, up to the present moment, not acquainted with the sciences bearing on Chemistry and Natural History. The State is not in the least concerned

about their scientific education. Hence they are not required by law to undergo any examination, and their medicines and drugs are not examined by any authorised body. The College of Physicians, it is true, have a right occasionally to examine the pharmacies in the city, regarding the genuineness of the drugs, but the college rarely avails itself of this prerogative. An Englishman greatly abhors an intrusion into his domestic affairs, and it would be a difficult thing to provide by law, that the examinations of the Pharmacies should become as general in England as they are in Germany. Prescriptions are required to be dispensed agreeably to the *Pharmacopœia Londinensis*; but even should it be proved that they are not so dispensed, the Chemist and Druggist is liable to no penalty. It is, therefore, easily conceived that tinctures of opium and other important medicines, kept in the various pharmacies, may frequently differ in strength. In cases of medicines being manifestly impure or even adulterated, the Chemist and Druggist cannot be called to account, unless the prosecutor can prove that such impurities or adulterations have been productive of serious injury. In such case, an indictment may be preferred, which is decided upon by the legal tribunals.

The State does not restrict Chemists and Druggists in their sales by any legally sanctioned limitation of prices; they may sell medicines as high as they choose. They moreover pay no tax to the State, excepting for the sale of patent medicines. Those who are acquainted with the manner in which the German pharmacies are conducted, and have been accustomed to consider them better managed than those of other countries, may suspect that the English public would be exposed to imposition, sophistication of medicines, and quackery of all sorts. But in England a check is kept on these abuses by the publicity which is always given to them when they occur; and guided by a sound common sense, medical men and the public soon find out where medicines are most conscienciously dispensed.

Among us the notion prevails that it is often difficult, or even impossible, to detect certain adulterations of medicines, and that if the pharmacies were numerous, and under no controul on the part of the Government, the public would have no means of counteracting the most flagrant impositions. The instance of England, however, shows that the mischief accruing is far less than one might at first be led to suppose†.

The number of Chemists and Druggists in London is very considerable, it cannot be precisely determined, but may amount to about 500 or 600. The population is two millions, hence there is one to every 3000 or 4000 inhabitants; but the number of Apothecaries is still greater; it amounts in London to about 700 or 800, although the number appears to have rather diminished lately. I have shown in my former paper that these individuals are, properly speaking, medical men; that they, however, materially differ from our Physicians, inas-

† Some time ago the state of Pharmacy in Hamburgh was similar to what it is now in England. The public were there also, conscientiously served by a certain number of active and scientific Pharmaceutists, in whom full confidence was placed, and who had extensive businesses, while the greater number of the Pharmaceutists were ill-provided and could scarcely find means to maintain themselves.

much as they dispense medicines and may prepare them in private laboratories of their own; but the medicines thus prepared are only for their own patients. As Apothecaries they do not keep shops, yet a great many, perhaps less than one-half, or one-third of them, are Chemists and Druggists also; and these keep open shops and prepare medicines prescribed by other medical men.

In addition, therefore, to 500 or 600 regular Pharmaceutists, medicines are prepared in London by several hundreds of other persons. Notwithstanding this great number, it appears that medicines are well prepared in such pharmacies as enjoy the confidence of medical men and the public. In these great cleanliness prevails, and a style of luxury is displayed in their manner of dispensing which is superior to ours. In a country in which restrictions do not exist, although the public cannot always judge of the quality of the articles supplied, yet confidence is placed only in such as really deserve it. So in Germany, the members of the medical profession are unrestricted in the exercise of their art; yet our public ultimately know how to distinguish the able man from the mere quack. Hence it is that many English Chemists and Druggists have very extensive businesses, and are, even in England, considered to be in affluent circumstances. Some of them have much larger concerns than any of our Pharmaceutists have, notwithstanding that ours are limited in number. Only a small number of Chemists and Druggists have laboratories of their own. Chemical substances are generally prepared in very large quantities by chemical manufacturers. Some Chemists and Druggists, however, who have received scientific education, prepare, on the large scale, such medicines as are usually less carefully made in the ordinary chemical manufactories, also new medicines, and they obtain large incomes in this way, as these preparations are sold at comparatively high prices to those who are less versed in their art. In most Pharmaceutical establishments, therefore, tinctures, extracts, ointments, plasters, and others of this description are the only preparations made.

The greatest defect in the state of Pharmacy in England, is, decidedly, the incomplete scientific education of most of the Chemists and Druggists; and especially their ignorance with reference to the sciences bearing on Chemistry and Natural History. Most of them are incapable, even, of testing the chemical preparations and drugs which they employ, as to their strength and purity, and are often embarrassed when a medical man attempts to introduce as a medicine any new chemical preparation. This evil, however, is felt by none more distinctly and strongly than it is by the English Pharmaceutists themselves. Even now, they are commencing a reform which has originated with their own body, and is therefore the more praiseworthy, inasmuch as they have not been driven to it by any act of the Government.

In 1842, a certain number of Chemists and Druggists in London formed a society, called the Pharmaceutical Society of Great Britain. The object of this institution is to unite the Chemists and Druggists into one independent body, to promote their common interests, and to induce them to submit to an uniform system of education, so as to keep pace with the progress of science, and provide for an efficient administration of medicine, which should be at once creditable to those engaged in it, and beneficial to the public.

It is hoped that an Act of Parliament may be obtained compelling

all those who may in future become Chemists and Druggists to pass an examination. None are admitted into the Society, even now, without undergoing an examination (excepting those who were in business before the Society commenced); but it is left optional with parties whether they will join the Society or not. Those who are examined are entitled to announce themselves publicly as Members, and it may be anticipated that the public, as well as the medical profession, will distinguish these by particular marks of confidence. The Council, and the Board of Examiners of the Society, consist of the most scientific men among the Pharmaceutists of London. The President is at present Mr. J. Savory, and the Vice-President Mr. T. Morson, two individuals whose establishments enjoy the highest reputation, and who are men of literary acquirements. The other Members are also Chemists and Druggists, among whom is Mr. Jacob Bell, who has most actively participated in promoting the establishment of the Society. Mr. Bell is also the editor of the *Pharmaceutical Journal and Transactions*, a publication which was started at the formation of the Society, and which contains a variety of papers and notices on Chemistry, Pharmacology, and Botany, including the Transactions of the Society. A great number of good original papers are published in this Journal, which deserves to be better known in Germany than it is at present.

In connection with the Pharmaceutical Society, there is also a School of Pharmacy, which is conducted in the Society's house. The pharmacological and chemical specimens forming the Museum of the Society, are employed at the lectures delivered in this school. The Laboratory, which is on the same premises, is excellently fitted up and arranged for the course of instruction through which the pupils are conducted here in the practical departments of Chemistry and Pharmacy. This laboratory, in its arrangements and organization, resembles that at University College, under Professor Fownes*. It has accommodation for about thirty pupils to work in it. The pupils are first engaged in Chemico-pharmaceutical operations; and at a later period of their studies, are conducted through a course of Chemico-analytical investigations. Chemistry is taught in the school by the very meritorious Professor Fownes, who also teaches the same subject, in conjunction with Graham, at University College. Professor Pereira, known from his work on Materia Medica, is the lecturer on this subject. Professor Redwood takes the department of Pharmacy, and Professor A. T. Thomson that of Botany.

The Professors in the school are not allowed to be examiners, nor is it contemplated at any time to require that the candidates who present themselves for examination, should have studied in this school.

Thus it appears, that although the English Pharmaceutists have hitherto been behind the Germans in regard to education, there is reason to anticipate that they will now make gradual but progressive steps towards the accomplishment of a thorough and beneficial reform.

In England, when the nature of an evil is made manifest, and the best means for its remedy have been fully ascertained, there is no lack of energy or activity in resorting to these means.

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* The laboratory at University College was fitted up after that in Bloomsbury Square.

If we compare the future prospects of the Chemists and Druggists of England, therefore, with those of the German Pharmaceutists, the result will not be very gratifying to us.

In Germany, and especially in Prussia, the Pharmaceutists are protected by the State. In each town the number of pharmacies is regulated according to the amount of population, and the proprietors are invested with what are called *privileges*, which pass from one generation to another, and are saleable like other property. The Pharmaceutist is obliged to pass through a course of scientific education, and he must undergo an examination; but he is placed in comparatively easy circumstances, by the State having fixed a scale of prices, which is rather high, yet not so much so as to become a grievance to the public. The charges are regulated according to this scale, and it is not lawful to charge either higher or lower, so that there is no competition.

In making this regulation, the object of the Government has been to provide for the welfare of the public, on the assumption that if the Pharmaceutist has the means of subsistence provided for him, he will have less temptation to depart from a conscientious performance of his duties than he otherwise would, and that there is more occasion for such a regulation in the case of the Pharmaceutist than in that of any other tradesman, the qualities and properties of whose goods are better understood by the public.

It cannot be denied that the *privileges* thus bestowed by the Government on the body of Pharmaceutists in Germany, and especially in Prussia, has been the cause of their having attained to a higher degree of scientific culture than their professional brethren in England and France, where they have to struggle against strong competition, and have some difficulty in earning a subsistence. Who can be ignorant of the number of scientific German Pharmaceutists, who during the last century, and at the commencement of the present, attained European celebrity in the field of Natural History as well as that of Chemistry? Indeed one might boldly assert, that the progress of chemical science in Germany has coincided with that of Pharmacy.

In latter times, however, a great change has taken place in this respect. In consequence of the long continuance of peace, the price of the *privileges* of pharmacies has risen to an extraordinary extent. It is now double what it used to be, and, in some cases, even more than this. These *privileges* have become objects of speculation, in the same way as houses or lands, and, like them, quickly pass from one owner to another. The object contemplated by the Government in granting *privileges*, namely, the securing to the Pharmaceutists an easy means of subsistence, has thus been frustrated; for most of them, with hard work, are now scarcely able to pay the interest on the capital required for their dearly-bought pharmacies; and overwhelmed with cares, on account of insufficient means of subsistence, they are hardly in a position to satisfy the claims made by the laws of the country and those of their own consciences.

The population having greatly increased since the war, the Government deemed it necessary to augment considerably the number of Pharmacies. At the same time, attention having been directed to the high prices at which *privileges* were sold, means were devised which, it was thought, would counteract this effect. Instead of *privileges*,

the State granted what are called *concessions*, which are not saleable, but pass, as an inheritance, to the nearest relatives.

In the provinces, which were ceded after the peace of Tilsit, and in which the corporate system was abolished, and freedom of trading generally introduced, and extended even to the Pharmaceutists, attempts were made to convert the *privileges* into *concessions*.

In granting *concessions*, however, it was found impossible to regulate the grants in accordance with principles of justice. They were often arbitrarily bestowed on those candidates who were not the most deserving. Moreover, the terms *privilege* and *concession* being but imperfectly defined, and being considered, in fact, as almost synonymous, the grant of a *concession* from the State amounted to a donation of great value. In an extensive town district, with a wealthy population, a *concession* might be worth from 10,000 to 20,000 thalers (£1,500 to £3,000 sterling); a donation which those who had paid high prices for their *privileges* could but consider as an injustice done to them.

It will be difficult to effect an improvement in the present depressed state of the affairs of the German Pharmaceutists, at least, without committing injustice in some direction. Should the Government raise the scale of prices, so as to compensate for the large sums paid for privileges and at the same time to secure ample means of subsistence to the Pharmaceutists, this would press heavily on the public, and would ultimately fail of effecting the intended object, because the value of the privileges would soon rise in the same proportion.

I do not propose entering minutely into a consideration of the best means of removing the evils under which the body of Pharmaceutists are suffering in Germany, but merely wish to show, that although the state of Pharmacy has been hitherto, on a lower footing in England than it has in Germany, yet there is reason to anticipate that in the former country it will improve, and soon occupy a higher position; while in the latter country, where it has hitherto been so flourishing, it is difficult to devise means for restoring it from its present depressed state.

Every branch of industry, when it is first started, requires the protection of the State. No unprejudiced person can deny that the industry of England and France is indebted for its superiority over that of Germany, almost entirely to the influence of protective duties. But all monopolies, all protection should cease to exist, as soon as they have accomplished their end; at a later period they would produce injury, even to those whom they were intended to benefit; yet much judgment is required in determining the proper time at which they should be abolished.

In the case of England, we have a striking instance in illustration of the above statement. Its industry being established, and having attained to great prosperity under protective duties, those who themselves depend upon the industry of the country, have carried the free-trade system even against the expressed opinions of the ministry, who were obliged to yield to the evident wish of the majority of the people. In that admirable country, where all matters of importance are fearlessly discussed with an enviable publicity, when once the public opinion is unequivocally pronounced in favour of any cause, the victory may be said to have been achieved, for no opposition, however high and powerful, can prevent the accomplishment of the desired object.

It may often be a long time before public opinion is decided, but this once accomplished, and the matter is settled. Thus, in the instances of Parliamentary Reform, the Emancipation of the Catholics and of Slaves, and the Reform in the Post-Office, notwithstanding the oppositions that were raised, including those of the sovereign and a most powerful aristocracy, yet the voice of the people was triumphant.

In Prussia, in the most disastrous times, when it became incumbent on the State to exert itself to the utmost, the guilds were abrogated, and freedom of trading introduced; and to this we owe the progress which has been made in our industry. The advantage derived from the guilds, in former times when the different branches of industry were in their infancy, cannot be doubted. Subsequently, however, the exigencies of the times required their abrogation, and for this the right period was no doubt fixed upon.

In November, 1810, when the restrictive system was abolished in Prussia, the Pharmaceutists were not exempted from its operation; but some months afterwards they were exempted by an act which met with almost universal approbation, especially from the Pharmaceutists themselves. Time however, has shown that this was a mistake.

To abolish the *privileges* of the Pharmaceutists suddenly, would certainly have been an act of injustice to the owners; but this might perhaps have been obviated by providing, that any one on setting up as a Pharmaceutist in any place, should pay to the Pharmaceutists previously established there, a sum equivalent to the average prices of *privileges* in that locality. This would have protected those previously established from unjust interference, and have checked the too great increase of pharmacies, while at the same time it would have allowed of competition: and, what I particularly lay stress upon is, that it would have prevented the arbitrary granting of *concessions* by the Government.

Now that a distinction has been established between *privileges* and *concessions*, it would be more difficult to carry such a measure; yet this, or one of a similar character, would probably, even now, notwithstanding the discordant opinions which are entertained on the subject, be best calculated to produce a beneficial result.

Let it not be thought that too great an increase in the number of pharmacies would be very disadvantageous to the public. No doubt the public would soon confer their patronage upon those who served them most conscientiously. Quackery may fascinate for a time, but in most cases it soon loses its influence. Even now those pharmacies enjoy the best reputation the proprietors of which are distinguished by industrious habits, scientific acquirements, and conscientious conduct; but the advantage resulting from the possession of these qualities would be still more general and apparent if competition were less restricted. The favourable locality of the pharmacy would then be of less importance than the qualities of the proprietor.

Utterly unscientific and ignorant Pharmaceutists, such as still exist in England, might be prevented from obtruding themselves upon the public by imposing scientific examinations, which, in proportion as competition increased, might be made more strict, and the public might be protected from fraud or imposition, at least to some extent, by having authorized examinations of the pharmacies.

In France it has been proposed to limit the number of pharmacies.

I would advise them to accomplish this by indirect means, or leave it in the hands of the corporation of Pharmaceutists to limit their own number, but to avoid the odious arbitrary interference of the Government, or the prevention of a beneficial competition by introducing the system of *privileges*, which may be useful to a branch of industry during its infancy, but in more advanced years serves to protect indiscriminately the negligent, with the active and conscientious.

The occupation of Pharmaceutist in Germany, and especially in Prussia, formerly enjoyed a reputation so justly merited, that every one who entertains a respect for the profession, must be grieved to see that it has now lost its wonted fame. From a pure love of Pharmacy, I have been induced to express an opinion, which, I apprehend, will be less favourably received among the Pharmaceutists than any other class, and this will arise from the preconceived notion which they entertain, that the only means of regaining their lost reputation, is by a still further interference on the part of the state. Let it be considered, however, that nothing is so much calculated to paralyze our own activity, as the habit of relying on others for protection and support. Yet it is only through their own energy and activity, that the Pharmaceutists can hope to improve their position.

I admit that we possess but partially the means of developing our energies, as we have neither a Constitution*, nor unrestricted liberty of the press. It is in consequence of the publicity that is freely given to abuses in England, that matters are conducted there so differently from what they are among us, and even should we acquire the same liberty as they possess, some time would probably elapse before we should learn to exercise it with as much wisdom, as is generally the case in that happy country.

AN ADDRESS TO THE CHEMISTS' ASSOCIATION OF BRISTOL AND CLIFTON.

Delivered July 19, 1847.

BY JOHN ADDINGTON SYMONDS, M.D.,

Consulting Physician to the Bristol General Hospital, &c.

At the first General Meeting of the Bristol Chemists' Association, held at the Rooms, 44, Broad Quay, on 19th July, 1847, Dr. Symonds addressed the Members; after which it was *proposed* by Mr. Ferris, *seconded* by Mr. Giles, "That the cordial Thanks of the Association be presented to Dr. Symonds for consenting to countenance their proceedings, and for the admirable and important Address which has now been delivered, and for his permission to publish the same."

Gentlemen,—I am happy to have this opportunity of congratulating you on the formation of your Society, which may reasonably be expected not only to bring respectability and general advantage to every member of it, but also to conduce in no slight degree to the interests

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* This paper was written in November, 1846.

of the public. It is always highly creditable to a body of men, to seek for the means of self improvement and reformation. The infrequency of such efforts has led to the common reproach that there is no such thing as a corporate conscience, and that consequently collections of men cannot feel the necessity of occasional acts of amendment, but that all reform must come from without and be forced upon them. That there are exceptions to this general statement cannot be denied, and an instance is happily presented in the formation of your Society, which, if I rightly understand its objects, is intended by educational and other measures, to diffuse among the members a more thorough acquaintance with the sciences of Chemistry and Pharmacy, as well as with the practical duties of your calling.

You have done me the honour of requesting me to address you at the commencement of your evening meetings. I cannot preface the little that I have to say better than by adverting to the significance of the name you bear—"The *Chemists*' Association." And, first, I may remark that there is nothing more curious in philological inquiries than to observe the extremely wide range which the meaning of some words will take—their expansibility on the one hand, their contractibility on the other. In the present state of science consider the enormous extent of capacity and the multitude of acquirements which the word *Chemist* involves when it is applied to a Davy, a Faraday, or a Liebig; and yet the same appellation (and I am sure you have too much good sense to be offended by the illustration) belongs to a man whose only connexion with chemistry is that he deals in articles which have been produced by chemical processes. Were this remark, Gentlemen, uttered in the way of reproach or sarcasm, it would be in the worst possible taste and feeling on the present occasion. And you might well retort that those who live within glass windows should have a care how they use projectiles. For what is the original meaning of the term *Physician?* It signifies one who is versed in all physical science, or the science of Nature (*φυσις*) in its most extended sense; yet the usual application of the term involves the knowledge of one department only, and is as striking an example as the former of the extreme contraction of meaning which a word may undergo. But the term *Chemist* is one that you may well claim not only from custom and prescriptive right, but also from your determination that the exercise of your calling shall be founded on a knowledge of chemical science, if not in its whole extent at least in its general principles, and especially in that department which is more immediately connected with your daily duties.

And what a prodigious science has this science of chemistry become! In all times it was full of portents. It sprang out of the dark ages,—and even then so mighty and productive of results beyond the ordinary experience of men, as to assume a form at once mysterious and questionable, if not worse. It dwelt in vaulted dungeons or solitary watch-towers. The superstitious peasant descried strange lights shooting through the chinks of the magician's chamber, and awful explosions broke the stillness of the midnight air, suggesting terrible unseen interferences—the crises of spiritual interposition of the worst description—to be named only in whispers. And there were stories afloat of wonderful masks, and precious stones, and unheard-of metals, and mysterious vessels, alembics, crucibles, furnaces—diabolic inventions all!

And though the art has long ceased to shun observation, and to dole out its products with reserve as to its processes—though it acts in the open day, or in brilliant gas-lighted lecture-rooms before great gatherings of men, it still ministers not less than ever to the sense of the wonderful and the sublime, and sometimes of the beautiful. All but the initiated are still astounded, and feel as if they were juggled. What can be more marvellous trickery than that before our eyes fixed on those few glasses connected by skeins of thread, a metal should suddenly take leave of its partner on the one side, and without any indication of disturbance, straightway make its appearance on the other side? The wonders of Chemistry need no mist or darkness to enhance them. Those of Alchemy looked larger because they were seen through a dim and magnifying medium. But now the brighter the light, and the stronger our vision, the more do we see of the vast form of Chemistry. There is no science on which it does not touch. All things, all properties, all changes, all motions of things, acting and acted upon, all lie more or less within the ken of this marvellous science! There seem to be no limits to its developments. If our fathers were dazzled by the novelty and splendour of Lavoisier's discoveries, I cannot imagine that the effect could have been more startling than that of the researches of our later Chemists in the department of organic nature. Mulder, Liebig, Dumas—what astonishing results and conclusions have not their labours arrived at! Ten years ago had you asked any one well acquainted with Chemistry whence the herbivorous animals derived all that nitrogen which enters into the composition of their tissues (think of the fibrin in sides of beef and legs of mutton!) he would have been sorely puzzled. That vegetables, with a few exceptions, were devoid of azote, was a fixed idea, and for my own part, as *nihil ex nihilo fit*, and the nitrogen must have been taken in from some source, I could only surmise that it was in some way obtained from the atmosphere, though all experimental investigations in the chemistry of respiration negatived such an idea. But the discovery of vegetable fibrin, albumen, and casein, dispelled all such weak ill-supported conjectures. And in connection with that grand discovery, what sublime views are now taken of the whole organic world! How delightful to follow Dumas and Boussingault as they trace that vast circle of actions and re-actions between vegetables, animals, and the atmosphere, showing how plants, having fed on the carbonic acid and ammonia in the atmosphere, fix the carbon and azote in their tissues and juices, and compound them into proximate principles to make the food of animals, which have no apparatus for assimilating carbon and azote in their elementary forms; and how the latter beings having consumed the one for the maintenance of their heat, and used the other in the vital actions of their organs, restore them once more to the atmosphere in the forms of carbonic acid and ammonia. Take this interesting passage relating to the maintenance of the supply of carbonic acid and ammonia in the atmosphere:—

"And as if all these grand phenomena were destined to be associated with causes which should appear the most remote, we may here observe upon the sources whence the oxide of ammonium and azotic acid, from which vegetables derive a portion of their food, are themselves derived. They are, in fact, produced upon the grand scale by the action of those magnificent electric sparks that dart from the storm-cloud, and furrowing

vast fields of air, engender in their course the nitrate of ammonia, which analysis discovers in the thunder-shower. As it is from the mouths of volcanoes, then, whose convulsions so often make the crust of our globe to tremble, that the principal food of plants, carbonic acid, is incessantly poured out, so is it from the atmosphere on fire with lightnings, from the bosom of the tempest, that the second and less indispensable aliment of plants, nitrate of ammonia, is showered down for their behoof.

"Might it not be said, that we have here a remembrance of that chaos mentioned in the Bible, of those periods of tumult and disorder which preceded the appearance of order and organization upon the earth?

"For scarcely are carbonic acid and nitrate of ammonia formed, than a calmer, though not less energetic, force begins to act upon them for new purposes: this force is *Light*. By the agency of light, carbonic acid yields up its carbon, water its hydrogen, nitrate of ammonia its nitrogen. These elements combine, organic matters are formed, and the earth is clothed with verdure."*

But I must not trust myself to dwell on these general views of chemical science, nor have I time to notice the applications of it to the arts. Take the whole range of useful, manufacturing, and even the fine arts, and I doubt if you could find one which has not been less or more influenced, directly or indirectly, by chemical researches.

Gentlemen,—The immense importance, nay, the indispensability of chemical knowledge to the occupations of your daily life is so obvious, that I am sure there is not a single member of your society whose mind is not deeply penetrated with the idea. But I may venture to hint to you, that independently of its professional value to you, your very occupation gives you opportunities, such as belong to no other, of pursuing the science as a delightful amusement and recreation. There is no science the study of which requires more assiduously the co-operation of the hands with the head. General results and views may be obtained through books, and through lectures illustrated by experiments, but for a thorough-going knowledge of the matter there is no royal road—the way must be dug and burrowed by your own hands. You must mix and melt, and test and weigh, and measure for yourselves. Happily for you, the apparatus you need is vastly less complex than when I was a student. Then one had no idea of work unless surrounded by retorts of all shapes and sizes, receivers, jars with stop-cocks without end, baths, furnaces, and I know not what. But now a piece or two of flat glass, a few test-tubes, a small platinum cup, a blow-pipe, a jet of gas, and some corks, flat and cylindrical, are nearly all the instruments you require—"Tools are for those who can use them," says the German proverb, and then it little matters what they are and how simple. Ever, Gentlemen, and in all things, it is the cunning hand, more than the instrument, that works marvels.

Your special art is the Art of Pharmacy, the preparation of remedies for the use of the medical practitioner. Of these, a large store are derived from the vegetable kingdom, and some few from the animal. You require then some practical acquaintance with Botany, for the Pharmaceutist has to identify the plants brought to him, to see that they have been collected at certain periods of growth, and to select the best specimens. He has also to preserve them from decay, and to

* *The Chemical and Physiological Balance of Organic Nature.* By Dumas and Boussingault, page 8.

prepare them for subsequent processes. A most responsible duty is this when you consider the activity of some of the agents contained in these substances. Then come the processes of drying, powdering, sifting, and the making of infusions, decoctions, and extracts. And here Chemistry interposes with a power and fertility of resource which it would be impossible to overrate. Now that Chemistry and Pharmacy work so well together it is curious to look back to the state of things in the days of the Galenists. After the disturbances in the medical world produced by the doctrines of Paracelsus, and the introduction of chemical remedies, practitioners became divided as to the choice of medicines into the hostile sects of Galenists and Chemists. The Galenists, or the followers of ancient medicine, the trudgers in the old paths, confined themselves to the use of herbs or *simples,* so called in contradistinction to the chemical compounds of their antagonists. They looked with horror at sulphur, antimony, mercury, and arsenic, and denounced them as poisonous, nay, as products of the Black Art, which no good Christian ought to meddle with. On the other hand, the chemical physicians seated aloft in the *Currus Triumphalis* of Basil Valentine (the title of a treatise by that worthy on the sovereign virtues of antimony), or borrowing the *petasi* of Hermes, regarded with contempt those of their brethren who were content with the trifling old-womanly remedies picked up in the fields, when they might enact such brilliant achievements by calling to their aid the all-powerful mineral medicaments. Could a representative of either sect be now resuscitated and introduced into a modern Pharmaceutical laboratory, great and inextricable would be the confusion of their ideas. At first, the Galenist would be cheered and comforted by the sight of packets of dried leaves and roots, and of bundles of succulent plants ready to give up their expressed juices. On the other hand, the disciple of Paracelsus would glance proudly over the metals and mineral masses, and the trays of glittering crystals. He would conceive a profound respect for that functionary who is about to separate the red precipitate or the black oxide. But what will he make of that other familiar, who, with apparently similar instruments and appliances, is about to operate on some vegetable matter? Here both the ghosts look puzzled! The modern by a refined chemical process, is extracting an alkaloid. Alas! they must go back to the world of shadows. All the old differences and controversies are gone by, or become obsolete. There is no antagonism of arts in the present day; they are all bound together by the ties of close affinity;—Chemistry and Herbalism have kissed each other,—and that beautiful and efficacious alkaloid, resulting from the combination of mineral and vegetable agencies, is a type of the benefit that ever accrues from the co-operation of separate sciences.

The manufacturers of medicinal preparations and compounds, and the dispensers of medical prescriptions in this kingdom, have in every respect done well by forming themselves into societies with such objects as yours. They not only profit by the mutual comparison of experience in their practical researches and operations, and by new suggestions and improvements (witness the advantage you derive from the *Pharmaceutical Transactions*), but also by the character which they present to the public. It is only repeating a truism to say, that the collision of minds engaged in kindred pursuits infallibly produces more than could have resulted from individual exertions. And if any

have unfortunately piqued themselves on the possession of secret methods of successful procedure in their operations, they are tempted by emulation and by the *eclât* attending the announcement, to submit them to the judgment of their associates, who are thus benefited, and, indirectly, the public also. Nor let any one suppose that he will ever be really a loser by laying open the results of superior knowledge, or superior practical skill. In the arrangements of Providence it was obviously designed that individual minds should work for the good of the many, and we may feel assured that in accordance with that equitable system of compensation which governs all human affairs and relations, the good which the individual does is in some way or other returned to him. In the existence of Pharmaceutical Societies the public have an evidence that you are resolved to keep pace with the knowledge of the day. The members of all professions must be continually reminded that knowledge is no longer monopolized—that there are no longer patents for producing this and that kind of information, and that the confidence reposed in them is not of that superstitious description which formerly took it for granted that the professor of an art was therefore a proficient in it. There must be proof. Now the proof looked for is partly in the products of his exertions; but as these can often be but imperfectly judged of, it is in a great measure founded on the fact that the individual in question has enjoyed opportunities of cultivating the science and art which he professes, and that he has availed himself of them with zealous industry. It is in this view then that I say, that by societies which provide lectures (such as the admirable course lately bestowed on you so liberally by my friend Dr. Staples), courses of practical instruction, and occasions of mutual conference, you give a guarantee to the public that you are considering their interests as well as your own.

You will now kindly bear with me while I offer you a few remarks on what you will admit to be in every respect an important subject—the relation in which you stand to that profession of which I have the honour to be a member. I need not say that you perform duties which were once undertaken solely by one division of the medical body—I mean the Apothecaries. An old inhabitant of this city once told me, that he remembered the time when there were only two persons who pursued the retail business of Chemist and Druggist. That which constitutes the principal part of your avocations was performed by Apothecaries. Our profession, I believe, are well satisfied that this part of their labours has been taken from them, as it often encroached very inconveniently on the time that was requisite for attendance on the sick. Division of labour, ever, in the end, commends itself to those who may at first seem likely to be injuriously affected by it. But while the medical practitioner may cheerfully resign that which was at one time a source of considerable emolument to him, he naturally expects that a strong line should be drawn between the preparation and dispensing of medicines on the one hand, and advice as to the management of sickness on the other. Without the rigid observation of this distinction, it is impossible that a good understanding can be kept up between the two parties. This, I am sure, is the opinion of those who hold the highest position in your body, both in the metropolis and the provinces. And it is because I

believe it to be a general feeling among you that I have consented to stand before you on the present occasion. Indeed, Gentlemen, in your particular employments you have enough on your hands. Your situation is one of high trust and honour, and of most weighty responsibilities. For while *we* are waging war with disease and death, we depend on you for the service of the ordnance department. Let our valour, prudence, generalship, be what they may, they must come to nought unless well supported by the munitions of war. In those critical turns of fate, when the destinies seem all but evenly balanced on either side, and the moment has come for prompt, energetic, and skilful action, consider the disastrous effect of a failure in the supply or in the temper of the weapons of conflict. With what thrilling interest do we read ever and again of the great battle of Waterloo, and how the farm of La Haye Sainte, the key to the central position of our army, was maintained against most unequal numbers. In vain had column after column of veteran warriors been launched against it—in vain did the skirmishers swarm round it like clouds of hornets;—still our brave soldiers held it, till alas! their ammunition was gone! for the only omission in the arrangements of the post had been the neglecting to break an opening into the building for the supply of such stores. And thus many valuable lives and brave hearts and hands were lost to the army. So I have known in the conduct of a critical case, at some particular juncture a particular remedy was wanted, which could not be procured, or was of indifferent quality, and the consequence was similarly disastrous.

This subject, as far as you are concerned, bears upon such points as the purity of drugs, their freshness, the careful preparation and admixture of medicines, the scrupulous weighing and measuring of doses. Now as to the first of these I need not remark, after the investigation which took place a year or two ago, that the practice of adulteration had got to a fearful pitch; and I am confident that all my hearers will to a man agree with me in thinking that of all the nefarious proceedings in trade ever heard of, this was without exception the most flagrantly iniquitous. All the parties concerned in it, whether thoughtlessly or not, were often promoters of suffering, and sometimes contrivers or abettors of wholesale murder. To weaken the power of a remedial agent is equivalent to the maintaining of disease. And it will not do to lay such a flattering unction to the soul as may be supplied by a general scepticism as to the efficacy of remedies (to which I grieve that some of my profession have sometimes recklessly given their sanction) for if that scepticism were well-founded, then the whole trade in medicines would be a lie and a cheat, that ought to be scouted from the world, and nearly all the practice of medicine a delusion and jugglery. Nor will it do to say, "It is well known that jalap powder is half linseed meal, and scammony more than half of it powdered slate, and iodide of potassium half carbonate of potass, and therefore the doses are prescribed accordingly." No prudent physician or surgeon would prescribe on such an hypothesis, for he knows that if a specimen chanced to be pretty pure, the patient's wellbeing might be endangered.

It may not be uninstructive if I offer you one or two examples of

the serious consequences that may depend on the purity or the careful preparation of medicines. A patient is ill with obstruction of the bowels—a complaint in the treatment of which the practitioner's ingenuity and knowledge are often taxed to the utmost. At a particular period the practitioner (we will suppose him to be young) may decide that he will give a fair trial to some medicine like croton oil or elaterium—and should that not succeed, that he will resort to some still more potent but a somewhat hazardous measure. After a few hours he repeats his visit, and finding that the hoped-for result has not occurred, he proposes to his associate the trial of an additional remedy. The latter is a man of large experience, and he says, "But are you sure the drug was good? I ordered the other day a dose of this medicine in a case which presented no particular difficulty, and it had no effect—I am sure the medicine is often of bad quality." Here then is a state of incertitude. It is after all a matter of doubt whether the remedy has had a fair trial, and whether it is expedient to resort to anything else; and yet time, precious time, is going on. Or take another case:—a patient labours under a peculiar and dangerous affection of the brain. It is important that he should have a good night's rest. From various considerations it may be determined that belladonna is the most eligible narcotic at this period. A full dose is prescribed, and on the good quality of the specimen hangs the fate of the patient; if there has been no sleep by the time of the next visit, the physician knowing the value of time in such a case may give an all-but-hopeless prognosis. Of course this may happen even when the medicine has been of the purest and best-prepared description, for the disease may have been uncontrollable, or the remedy not well chosen. I hardly need to observe that the more potent the drug the more important is it that we should be well assured of the purity and activity of the particular specimen which we are about to employ. Take for instance, such substances as digitalis, hydrocyanic acid, opium, morphia, and strychnia. The very goodness of the article sometimes embarrasses the practitioner. This difficulty I have sometimes felt with the last-named substance. I consider that it is better prepared than formerly, for I do not find that patients can take it in the doses which I was in the habit of prescribing when it first came into use. But to pass from critical cases to some of the chronic maladies, which are attended with suffering and inconvenience rather than with danger. The Physician prescribes a medicine composed chiefly of sarsaparilla, or taraxacum, or dulcamara, or hemlock, or pareira brava, and desires his patient to call again in ten days or a fortnight. He comes grievously disappointed, being no better. This, in many cases, is simply owing to the fact that the complaint is not to be removed by the medicine prescribed; but it may depend on the bad quality of the drug. One of three things may be the consequence: First, the disheartening effect on the mind of the patient; Secondly, the diminution of confidence in his adviser, or, if this is too firmly established to be thus shaken, there may be—Thirdly, a great doubt as to the quality of the drug combined with a strong wish to change the dispenser. It is often as much as the prescriber can accomplish to prevent this desire from being carried into effect.

Gentlemen, it is better that we should be open with one another.

We all know that it is in many cases very difficult to test the activity of medicines, for the investigation is beset with many causes of fallacy and ambiguity. We have to rely on you, and you have to rely on the wholesale producer, and it is very often entirely a faith in character. I am almost every day asked the question, "Do you think the medicine is good?" Perhaps the form of it is a pill! All I can say is, when I have heard the name of the Chemist, "Mr. —— is a highly respectable man, careful, intelligent, attentive, and conscientious. I have no doubt he has taken the best means for procuring good articles, and has prepared them accurately." Oh! believe me, this is a solemn matter. Many a weary aching hour does the practitioner spend in reflecting on the past treatment of the case, and in critically considering what were the errors of omission or commission. This is one of the hard trials of our lot, and it is well for our patients that we are thus exercised. But I trust that this anxious deliberation is sometimes participated by you—that you, in a spirit of earnest self-examination often ask yourselves whether you have taken all possible pains in securing the efficacy of the remedies, the preparation of which had been in all good faith intrusted to you.

Before I conclude, allow me to say one word as to the conduct of your assistants. Their instruction in their particular duties of course devolves upon you, together with the superintendence of their labours in your behalf. *Expertus loquor.* I know the carelessness of young hands, their audacity in guessing weights and measures,* and their ingenuity in substitutions when it was inconvenient to make a fresh infusion or decoction, or when they had to deal with things intractable and refractory to the fingers which had to mould them into pills. I doubt not you impress upon their minds the necessity of attending with minute scrupulosity to the smallest matters. You must be well aware of the importance which both patients and their friends attach to little particulars. Suppose for instance, that pills are made of unequal size: an anxious relation will scrutinize them and say, "How do I know but that some powerful agent is contained in these pills? A small one must be an under-dose, and my child's complaint is very severe. A large pill is an over-dose—will not peril ensue if I give it?" In the anxieties, fears, and perturbations of the sick-chamber, every thing is magnified, every variation in treatment is noticed, and confidence is easily shaken. But this view of the subject is comparatively an interested one. Let me rather suggest to you that it is desirable to teach your pupils the absolute *duty* of rigorous care carried even to scrupulosity. Tell them that though in light-hearted moments they may think but little of slips of carelessness, yet a time may come, when they will have to answer for such faults to their conscience and their God.

I now conclude by requesting, that if I have in any of these latter remarks appeared presumptuous or intrusive, by reminding you of

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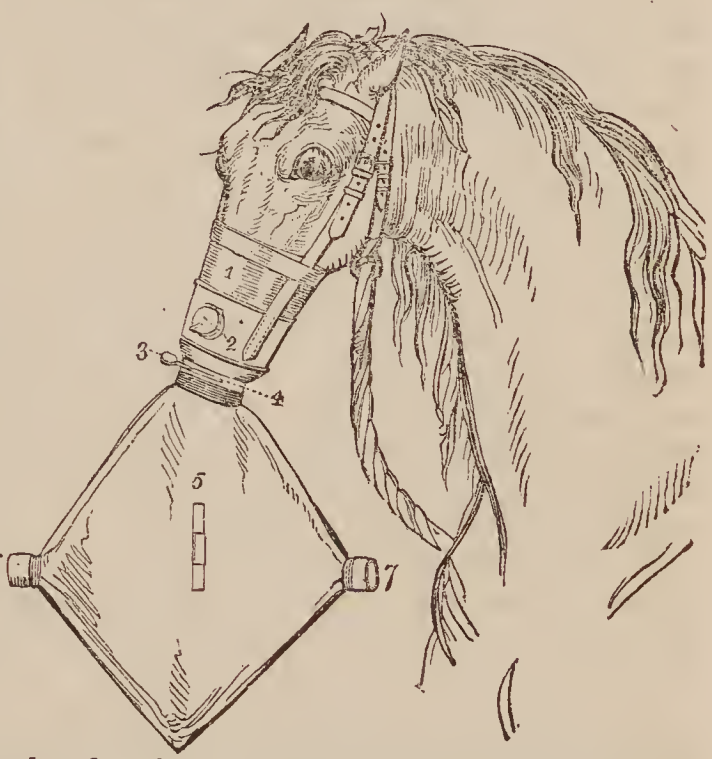
* I remember hearing some years ago of two young apprentices who met in the street and compared notes as to their relative proficiency in the same calling: "How are you getting on?" "Oh, pretty well—I can *guess calomel!*"

duties to which you are already sufficiently alive, you will kindly forgive me, and believe that what I have said has proceeded from good intentions. I should not have taken the trouble to go even thus briefly into the matter had I not had your welfare at heart, and had I not conceived a great respect for a body of men who have voluntarily constituted themselves into an Association for mutual improvement, and the advancement of Pharmaceutical art. Long may your Institution prosper, and fully may it realize your most sanguine expectations!

HORSE INHALER.

BY MR. W. HOOPER, 7, PALL MALL EAST.

1. Muzzle.
2. Expiring valve.
3 & 4. Bayonet joint & inhaling valve.
5. Vulcanized India-rubber bag.
6 & 7. Inhaling tubes.



Directions.—The muzzle and vulcanized India-rubber (connected by a bayonet joint) should be detached before being applied.

The *muzzle* is fixed to the horse by means of a head-piece similar to a bridle, and a tight India-rubber band placed over it near the top.

The moveable brass piece underneath the muzzle should be *closed*, and the *expiring* valve kept *open* by the bent wire being placed underneath whilst fixing it.

The sponge in the vulcanized bag should be taken out and soaked for a few seconds in *hot* water, and then quickly wrung and put back into the bag, into which is poured the ether.

The bag should then be attached to the muzzle.

A strap in the front of the head-piece should be passed through the loop in the bag, to prevent its collapsing.

The moveable brass piece to be *opened*, and the bent wire underneath the *expiring valve* removed that the valve may be set free.

In general the horse falls in about three to five minutes, when the head should be quickly secured, and according to the degree of stupor, so must the expiring valve be kept open, and the moveable brass piece closed at the judgment of the operator.

ON THE DUTIES OF AN AGRICULTURAL CHEMIST,

LOCATED AT ONE OF OUR SUGAR-PRODUCING COLONIES.

THE following is an abstract from a report on the above subject, presented to the Governor of British Guiana, by John Sheir, LL. D., Agricultural Chemist to the Colony. We insert it, partly with the view of directing attention to the important field for investigation which our colonies present to the rising generation of scientific Chemists, and partly as an illustration of the sort of investigations which might be pursued in other localities.

1.—PRELIMINARY DUTIES.

a. To collect Materials for the Analytical Researches.—For this purpose the Chemist should visit the different localities of the colony, so that the selection of materials may be made under his own personal superintendence. The substances which at present seem most urgently to require examination, are canes and cane-ash, soils and subsoils, especially such as are characteristic of considerable areas, specimens of sugar, molasses, distillery leys, skimmings; also plantains, healthy and diseased, coffee, &c. The substances thus collected to be arranged and labelled to wait such analytical operations as may be deemed necessary.

b. During this visit, the Chemist would also have it in his power to become acquainted with the physical condition of the soil, particularly in reference to the question of close or covered drainage.

c. To visit as many of the estates, in the different districts of the colony, as might be necessary to enable him to become acquainted with the present processes of culture and manufacture, so as to form an accurate opinion of their merits and defects.

d. To collect and embody a series of statistical observations on the subjects of produce, labour, wages, manufacture, exports, and imports. Some of the data would be obtained from proprietors of estates and managers, some from the records of the Agricultural and Commercial Society, and some from the public offices.

e. Among the preliminary duties of the Agricultural Chemist may be also mentioned, the superintendence of the fitting up of the laboratory with all the means and appliances required for chemical research.

2.—CHEMICAL RESEARCHES.

It is not possible completely to foresee all the directions into which these researches may branch; but the following points will certainly require strict investigation :—

a. The Composition and Limits of Variation of the Cane-Ash.—Here it may be necessary to explain that the ash of the cane consists of such inorganic or mineral matters as the plants derive from the soil.

These substances are essential to the healthy growth and full development of the cane; and an exact knowledge of their nature, and of the proportions in which they occur, is required before the best method of cultivating the cane can be indicated. Of soils, those that are capable of affording the fullest and most seasonable supply of those mineral constituents are, *cæteris paribus*, the most fertile. It is known that these mineral elements vary considerably in canes grown on different soils, and it is a matter of vast importance to determine the law and limits of this variation, inasmuch as by altering those circumstances of cultivation over which we possess control, it is certain that the quality and productiveness of the crop may be materially improved. The very important bearings of this research on the subject of manuring the soils and preventing exhaustion will be explained under another head.

b. The Texture or State of Mechanical Division of the parts of the Soils.—Although this is not strictly a chemical investigation, it can be well performed only in the laboratory.

c. Chemical Composition of Soils.—Although I consider the examination of the ash of cultivated crops and of weeds the most scientific and legitimate way of ascertaining the composition of the soils in which they grow, because we thereby learn what substances the soil can render up to plants, still a minute chemical analysis of soils, especially those that are characteristic of large areas, has its uses and is desirable. I regard, therefore, every typical soil of the colony as worthy of both a textural and minute chemical analysis.

d. The Composition of the Ash of Characteristic Weeds.—The ashes of different orders of plants, and even of different species, so far as they have been examined, have been proved to differ in chemical composition. Hence it is highly desirable that the various characteristic weeds should be subjected to a rigid chemical investigation, for the purpose of ascertaining what substances they rob the soil of, and what substances and condition of soil their presence indicates. Weeds would thus be rendered the exponents of the composition and texture of the soil, and would ultimately serve as guides to practice without reiterated chemical examinations.

e. The Composition of Manures most suited to Cane-culture.—To the question, 'What substances are required to be added to any soil to increase or maintain its fertility in producing canes?' a satisfactory answer cannot be given till many minute analyses of the sugarcane have been made, and the law of variation of the composition of its ash has been ascertained. In the meantime it is proper to call attention to a remarkable peculiarity of cane-culture, namely, that in pure *sugar*, NO *ash or inorganic substance* is exported. Hence, if the megàss-ash is restored to the soil in a state not liable to be washed out of it before it can become available to the growing canes, no deterioration or exhaustion of inorganic constituents can occur. In this respect cane-culture stands in remarkable and very fortunate contrast with the cultivation of grain or root-crops, in both of which a large quantity of valuable inorganic matters are exported, and a time must occur, even in the care of the most fertile soils, when this exhaustion must be repaired by supplies of manure from extraneous sources, otherwise the land will cease to be productive. It is notorious, however, that the megàss-ash has never been systematically restored to the soil in this colony, but has either been thrown away or employed to make mortar or repair the roads. I consider, therefore, that before looking to any foreign manures, such as guano or bone-dust, that the investigation of a method of restoring the megàss-ash to the soil in the most effective and economical manner, is a matter of the greatest practical importance. There are no doubt many soils in the colony so rich, that with good tillage it might be imprudent, in the first instance, to apply any manure lest the crop should be lost by over luxuriance; but this applies only to new land, and continued cultivation soon begins to show the gradual diminution of returns. Besides the megàss-ash, there are various residuary matters that merit attention, such as stable manure,—a substance that will occur in large quantity immediately on the introduction of cattle-labour, and the leys or residuum of the rum-still,—a substance capable of being converted into an excellent manure, but which is at present allowed to run to waste and to evolve the most noxious effluvia in the draining-trenches.

f. On the Manufacture of Sugar with new and improved Apparatus.—This presents one of the most important and desirable fields of research. It is an independent investigation, and not necessarily connected with the success of new methods of cultivation; for its results apply to canes grown under any system. That planters are sensible of the deficiencies of the whole process of sugar-making, is apparent from the readiness with

which all schemes of improvement have been entertained, and the large sums of money that have been spent on trials, many of which have proved abortive. After a careful examination of many of those plans, I have been led to conclude that many of the failures have occurred because the methods originated with refiners at home, or were derived solely from their processes. No nearly allied processes can be more distinct than the original process of preparing sugar from fresh cane-juice, and the refining of sugar from muscovado or molasses. The refiner has to deal with materials of tolerably uniform character, made, or mis-made to his hand, and containing comparatively few troublesome constituents. The conductor of the original process has to operate on a highly complex juice, containing bodies, which, if they must be permitted to enter, or cannot be removed at the first step, entail an amount of labour and deterioration of the produce not easily conceived by those unacquainted with the *rationale* of the operation. So different are the materials operated upon by the original maker and the refiner, that I have no hesitation in saying that improvements, based *solely* on refiners' processes, cannot but prove inadequate and unsatisfactory. I am of opinion that a careful study and experimental investigation into the nature of fresh cane-juice could not fail to discover methods greatly better than those now in use. Prior to such research, it would be idle to hazard even a guess at what the improvements of the process should be; but of the necessity of the investigation, and of the reasonableness of the expectation that its results would be attended with great benefit, no doubt whatever can be entertained. This research will of necessity occupy a considerable time, and the processes indicated by the laboratory results will require verification on the large scale.

g. On Improvements in the Method of manufacturing Sugar, with the Apparatus at present in Use.—Although it were granted that improved methods of manufacture were discovered, it is yet certain that on many estates the old apparatus would require to remain in use till it was worked out, or till the proprietor found it both safe and convenient to adopt the improved methods. Hence, I regard it as a point of some practical importance to examine the old method carefully, for the purpose of introducing into it a system of regulating checks and tests to render it more fixed and uniform, and to free it as far as possible from the empiricism which at present characterises it. The more a process is regulated by tests and instruments, the less skill is required of the workmen, and the more certain and uniform will the process become. All manufacturers aim at leaving as little as possible to the discretion of their workmen. Hitherto the general rule observed by the negro sugar-boilers, is what has been vulgarly, though not inappropriately termed, rule of thumb,—a rule, than which there could be few better when the workmen possess the greatest skill and judgment, and are at the same time steady and conscientious; but also a rule than which there could be no worse in the hands of irregular, unconscientious, and careless labourers.

"*h. On Improvements in the Process of Fermentation and in the Distilling of Rum.*—As now practised in this colony, I consider this art in a less advanced state than that of sugar-making. Could the molasses and lower grades of muscovado find their way unobstructed into the British distilleries, it would be only the skimmings and the juice of deteriorated canes that would remain to be dealt with. In that case, the object of the research would be to improve the quality and flavour of the spirit, and by some means to render it more capable of competing with that produced by the older colonies. If, however, from any cause, such as the nature of tariffs or the low prices at home, a large quantity of saccharine matter should have to be worked into spirit, then it is probable that the research might have for its object the means of producing the largest quantity of strong spirit without so much reference to its flavour. The two objects require very

different kinds of apparatus, a fact not as yet generally recognised in the colony ; but in either case more method and skill are loudly called for. To illustrate by but a single instance of mismanagement, I may mention, that since I came to the colony, I have not met with a single case in which the leys or residuum about to be run to waste, did not contain a considerable, and in some cases, a large amount of unfermented sweets.

" The previous remarks on the chemical researches which will probably require to be made, have exclusive reference to the sugar-cane ; to avoid tediousness, no mention has been made of the coffee-plant, the plantain, &c., it being taken for granted that when the nature and tendency of research are illustrated in reference to one plant, it may with less difficulty be inferred with reference to others.

3. MIXED RESEARCHES TO BE CARRIED ON SIMULTANEOUSLY WITH THE CHEMICAL RESEARCHES.

a. Supervision of the public experiment on covered or thorough drainage.—As a special report on this subject is in course of preparation, it may be sufficient here to remark, that this experiment is one of the greatest importance, not merely when viewed as a means of drying and deepening the soil, but as an essential preliminary to the introduction of cattle labour and improved agricultural implements. The proper function of the first experiment will be to test the efficiency of the operation under the peculiar circumstances of soil and climate ; others should follow to show how the operation may be conducted at the least expense.

b. Various Experiments consequent on the Success of the Drainage Experiment.—Should the drainage experiment succeed, an improved method of cultivation must inevitably follow, involving the use of improved implements of husbandry, cattle-labour, and manures ; a regular system of rotation, wherein provision for the cattle shall form a part ; more effectual tillage, a regular system of cutting the canes at stated periods of the year, if such be practicable ; more frequent planting, and other improvements that will readily suggest themselves to those acquainted with the subject.

c. Verification of Projected Improvements.—Every day new pieces of apparatus and methods of sugar-making are urged on the attention of planters by machinists and patentees. It is worthy of consideration whether it might not form a part of the duties of the Agricultural Chemist to make himself acquainted with the details of such methods and pieces of apparatus, that when called upon to give an opinion regarding them, he might be able to do so. As examples, it may be mentioned, that at present there are three improved methods whose inventors are pressing them on public notice; they are the steam vacuum, the revolving evaporator, and the dry-blast evaporator. Were an opportunity afforded to the Chemist of making observations on their working, his opinion might be of service to those who had no opportunity of judging for themselves whether a piece of apparatus, useful in certain circumstances, were suitable to the special requirements of this colony.

d. On the improvement of the Plants of Cultivation, and the Introduction of New Species.—This subject is more of a physiological than a chemical nature. Under this head it may be mentioned that there are several plants, natives of this colony, although not hitherto cultivated, which produce substances of great commercial value. The cinchonas and the vanilla may be given as examples, and as the price of cinchona bark and vanilla pods has for some time been steadily increasing, in the first instance certainly from the increasing scarcity of the plants, it appears reasonable that in a country possessing so much waste land suited to their growth, that trials should be made whether under a sort of half-wild culture they might not be worthy of the attention of agriculturists.

ON THE MANUFACTURE OF ARTIFICIAL GUM.

BY M. EMILE THOMAS.

Dextrine is now met with in commerce in three distinct forms, viz., in the form of a white, brilliant, and pearly powder; as a syrupy solution; and in the form of exotic gum, in greater or less perfection, either broken into small fragments, or made into rolls of various sizes.

Some short time ago, dextrine was only produced in the state of powder; and if some manufacturers have sought to give to it the appearance of the product for which it is to be substituted, they may have been induced to do so from the conviction that the only way to supersede the old plan was by humouring and even deceiving its disciples with the outward appearance of the new product. In this way our learned professor, M. Payen, who was formerly a manufacturer of some eminence, introduced borax of French manufacture, by giving it the dusty appearance of the Dutch crystals of borax, rounded and polished by the friction during their conveyance.

It has since been discovered that the gummy form of dextrine possessed many great advantages, not at first contemplated. I shall allude to this presently, but would first observe, that there appears to be one disadvantage attending this form. Some intelligent persons were apprehensive that, taking advantage of the resemblance, exotic gum would be adulterated with artificial gum; fortunately this is impracticable, as the smell and taste of potato oil, which is always given out by artificial gum, are sufficient to betray its presence; and thus, if the purchaser suspects a fraud, he can easily detect it.

Dextrine may be manufactured either by the use of acids, or by means of the diastase contained in malted barley. I will examine these various processes in succession.

By Sulphuric Acid.—The dextrine produced possesses the disadvantageous property of being deliquiscent. This method is therefore never employed, as, besides this disadvantage, the products are often coloured.

By Nitric Acid.—This method is now most generally followed for obtaining dextrine in the state of powder. The acid employed must be perfectly pure, and for this reason—that nitric acid, as is well known, is obtained by the decomposition of nitrate of soda, obtained in the natural state from the coast of Bolivia, by means of sulphuric acid. Now this salt always contains a portion of sea salt, which, together with the sulphuric acid, and nitric acid, generates chlorine. Although but a small portion of this chlorine is contained in the acid, and consequently in much less proportion in the dextrine produced by that acid, it is nevertheless sufficient to considerably diminish the brilliancy and depth of the colours prepared with the dextrine. Several printers upon paper and fabrics have observed this, without being able to account for it otherwise than by attributing it to the inferior quality of the gum.

By Hydrochloric Acid.—This process is only employed to my knowledge by Messrs. Saint Etienne, who first render the starch soluble, as in the former process, by means of a small dose of acid, and by torrefaction, or rather desiccation, at a high temperature.

The powder thus obtained is afterwards thrown upon a metallic sieve, and submitted to the action of a jet of steam, which damps the dextrine to such an extent as to render it transparent without liquefying it; so that it will require very little drying afterwards. This process possesses the disadvantage of requiring great ability on the part of the workman charged with the hydration of the dextrine. The manipulation necessary for this operation is not acquired without great difficulty; so much so, indeed, that M. Saint Etienne, jun., who directs the working of his process in England, has not yet been able to find any person capable of undertaking this part of the work. Messrs. Saint Etienne prefer to use hydrochloric acid.

By Diastase.—This process seems the most worthy of attention in all

respects ; as, by adapting to it some modifications, which I have tried on a large scale, it will be found to be the one giving the most perfect results. I will therefore describe it fully.

The fecula must be rendered soluble in vats, heated by steam in such a manner that the temperature may be easily raised or lowered. The fecula is first mixed with four times its weight of water, previously heated to about 50° ; for this purpose the fecula is gradually introduced into the vessel or boiler containing the hot water. In London, I employed copper boilers, with a double bottom, capable of containing about 400 gallons ; and at one operation, about 600 lbs. of fecula, mixed with 1200 quarts of water, were decomposed. The temperature must be kept at about 60° until the whole mass is converted into starch: 2 per cent. by weight of very white malted barley is then added, and also the mucilage produced from 1 per cent. of linseed.

If a greater proportion of malt than that which I have mentioned were added, the decomposition would doubtless be more rapid; but a larger quantity of glucose would be formed, and the gum would be more coloured. With regard to the utility of the mucilage of linseed, it imparts tenacity to the gum. Instead of this substance, I attempted to use lichen ; but it did not answer, although the products were much whiter, by reason of the mucilage depositing itself upon the sides of the boiler, and preventing the liquid from boiling. It is, besides, not so strong as the linseed mucilage.

The mixture must be kept at a temperature of about 50° or 60°, until all the starch is again dissolved ; the temperature should then be suddenly raised, taking care, however, not to exceed 75° C., but keeping as near that temperature as possible, in order to cause the diastase to act as powerfully as possible. It will then be necessary to stir the mixture well, until the decomposition is almost complete ; this may be ascertained by the deep blue tint the mixture assumes, and by the action of the solution of iodine, which in that case will colour the dextrine of a violet, approaching to red, without any mixture of blue.

It is unnecessary to say, that during the decomposition, the liquid must be kept constantly in motion. The operation lasts about an hour and a quarter, that is to say, a quarter of an hour for the formation of the paste, one for its dissolution, and the other three-quarters for rendering it soluble.

I much prefer this method of forming the paste to adding the malt, as the reagent spreads much more uniformly throughout the mass, and does not at once fall to the bottom of the vessel in which the operation is performed.

The liquor must now be removed from the decomposing vats, and left in pans to settle for from six to eighteen hours, according to the external temperature. During this time a slight fermentation will be perceptible, but it must be checked by adding alum in the proportion of ten grammes for every twenty-five gallons of liquid. It is essential to allow this time for the mixture to settle, as it prevents two serious evils ; viz. the colouring of the gum while baking, and a singular phenomenon so often observed in evaporating viscous liquids, viz. their being quite still, and which I have ascertained is caused by the formation of a very thick sediment on the sides of the evaporating vessels.

The liquor, when drawn off after settling, will mark about 10° B., and it is evaporated by raising it very slowly to the boiling point ; which precaution is indispensable, for the perfect clarification is accelerated by checking the first boiling, as in refining sugar. This clarification is effected without any foreign agent, by the coagulation of the vegetable albumen contained in the malt and the linseed mucilage. As scum will continue to rise to the top of the mucilaginous syrup during most of the time of baking, it will be necessary to remove it carefully ; and if the boiling is too much accelerated, the gum will first become thick, and afterwards will be coloured. When a solid pelicle of gum is formed at the surface of the syrup, the baking will be completed, at which time the syrup will mark about 35° B.

If it be desired to keep the gum in a liquid form, the baking must be stopped at 30° while boiling; the syrup must then be poured into well-closed vessels, previously rubbed with oil of turpentine, and the surface of the gum covered with a thin layer of that oil. This method succeeded pretty well for preventing the fermentation of the liquid gum.

When it is desired to solidify the gum, the boiling syrup is poured into small flat tin vessels, placed upon a hot air stove, kept at a temperature of from 40° to 50° C. At the end of twenty-four hours the gum will acquire the consistency of jujube paste; it is then cut up into small oblong pieces with a pair of shears, and these pieces are rolled out upon a polished table, with a wooden roller, dusted with pulverized artificial gum, and afterwards placed upon wooden frames, and left for three or four days to dry. The gum would be much better dried by letting the syrup run upon a cylinder heated to 110° or 120°; but the economy of this process is questionable. The artificial gum thus prepared is easily dissolved, and makes a very clear solution; over dextrine, in the state of powder, it possesses the advantage of being more readily packed; and over liquid gum, the advantage of not fermenting.

The experiments which I have made with the various products of starch have led me to other inquiries upon analogous substances, and principally upon ligneous fibre and cellular tissue, which, as is well known, according to the experiments of M. Payen, are of the same composition as starch. At a future meeting I hope to communicate to the Society the results of some experiments upon the steeping of textile fibres, by means of processes analogous to those employed in manufacturing dextrine or sugar.

I will conclude by some observations upon an improvement which may be introduced in the manufacture of starch by washing. In the manufactory at Habertonford Mills, in the county of Devon, where M. Saint Etienne is superintendent, he is occupied in the production of starch by M. E. Martin's process, which consists, as is well known, in washing the paste obtained by means of wheaten flour under the action of a current of water and a mechanical softener. For this process it is essential that flour may be easily procured. Not having this facility, M. Saint Etienne conceived the idea of steeping the grain whole in water for two or three days, and then crushing it between rollers, and thus forming the paste. But this method was attended with a serious evil, viz., that the starch was not deposited, especially in summer. M. Saint Etienne attributed this to the quality of the water, but I convinced him that it was owing to the fermentation and partial germination of the corn, which being so long in contact with the water formed successively diastase and dextrine, and thus rendered the water which was used for washing the starch viscous. At my suggestion, he constructed an apparatus of wood, lined with lead, and having filled it three parts full of corn, he then added water sufficient to cover it. This apparatus was submitted to a constant heat of 50° C. as the maximum, with a pressure of from 15 to 20 atmospheres, and in four or five hours the grain swelled so as to completely fill the apparatus. A great quantity of water being thus absorbed, a paste could easily be formed by passing it between wooden rollers. Paste thus obtained may be used for making starch, care being taken to leave it to settle for two hours longer than the paste made with flour, before softening it; there is then less fear of fermentation, and about ten per cent. more available paste will be obtained than by grinding.—Newton's *London Journal*, No. clxxix., and *Chemical Gazette*.

ACCIDENT WITH OXALIC ACID.

Francis Endecott, footman to Dr. Pereira, was brought before Mr. Alderman Wood, on the 13th of August, on suspicion of having attempted to poison his child. The prisoner stated that he had obtained some oxalic acid from his master's surgery, and mixed it with currant jelly and water,

in order to poison some cats. The child had taken the bottle from the table and swallowed about half a teaspoonful. As soon as he was aware of the fact, he sent for medical advice and administered salt and water. Mr. Stolman, of Fleet Street, Apothecary, shortly arrived and ordered milk to be given, and afterwards mustard and water! A Chemist would have administered chalk, which is the antidote for oxalic acid; but it appears that the Apothecary was not a Chemist. Fortunately the child survived, from which we may infer that very little, if any, of the poison was actually swallowed. Alderman Wood censured the servant for his negligence in placing the poison within reach of the child; and also censured Dr. Pereira for allowing his servant the opportunity of helping himself to poisons in his surgery! We may observe, in the first place, that Dr. Pereira has no surgery; and if he was to blame for allowing his servant the opportunity of obtaining oxalic acid, the blame is equally applicable to every person who wears top-boots, or keeps a saddle horse. Probably the Alderman was not aware that every groom uses oxalic acid for cleaning top-boots and saddles.

DEATH FROM INHALING SULPHURETTED HYDROGEN GAS.

An inquest was held, on the 7th of August, at the Crown tavern, Long Acre, on the body of George Cross, who was found dead in a privy in Langley Court, where he resided. There was a very offensive smell in the yard at the time, which had not been perceptible half an hour before. This was occasioned by a person throwing two or three quarts of damaged oil of vitriol into the drain in the adjoining back yard, which decomposed the contents of the drain, causing the evolution of sulphuretted hydrogen and other noxious gases.

It was stated in the evidence that the sewerage was very defective, there being no sewer in Long Acre. The sewer in Langley Court was partially stopped by an accumulation of soil. Lime had been thrown down the drain, and the sulphuret of calcium thus formed was decomposed by the oil of vitriol.

Mr. Berry, surgeon, who was called in, and made a *post mortem* examination, stated that the lungs were gorged with blood, and emitted, when cut, an offensive odour. He considered that death was occasioned by inhaling sulphuretted hydrogen, probably mixed with carbonic acid. The silver in the pocket of deceased was quite black.

Our space does not admit of a detailed report of the case.

ANOTHER CASE OF POISONING THROUGH GROSS NEGLIGENCE.

We have so often had occasion to record deaths arising from the want of proper precaution on the part of general shopkeepers who dispense poisonous drugs, as to make it appear that nothing less than some heavy punishment, as an example, will correct the evil. Another instance of the kind occurred at Eye, near Peterborough, a few weeks ago. It seems that Sarah Green, wife of Joseph Green, labourer, of that place, sent a female lodger, named Boughton, on the previous evening, to fetch a pennyworth of Godfrey's cordial, she having been accustomed to administer that kind of medicine to her child, about five months old. Boughton took two phials, and proceeded to the shop of Christopher Peach, grocer, where she asked for a pennyworth of laudanum for herself, and a pennyworth of Godfrey's cordial for Sarah Green's child. Mrs. Peach served her, and the phials with the contents were taken to Green's house and put away. On Sunday evening, the child being fretful, the mother reached the Godfrey's cordial bottle, and gave about a teaspoonful of the contents to the child: the infant evidently did not like it, upon which Boughton tasted

the liquid, and found that it was laudanum. Rue tea and antimonial wine were administered as antidotes, and Mr. Southam, surgeon, was afterwards called in, who ordered a bath and other applications, but the child gradually sank, and died within a few hours. On investigation, it turned out that Mrs. Peach had incautiously served the drugs from the wrong bottles ; into the phial used for Godfrey's cordial she had poured four times the quantity of laudanum usually sold for a penny, and into the phial used for laudanum she had poured only one-fourth the quantity of Godfrey's eordial sold for that amount. Neither of the bottles was labelled "laudanum—poison," as is generally done by respectable Druggists. A coroner's inquiry into the ease is pending ; and it is hoped that something will be done to put a stop to the indiseriminate sale of poisons by unqualified persons.—*Stamford Mercury.*

SALE OF POISONS.

At the commencement of the Assizes for the county of Suffolk, held at Ipswich, on the 28th of July, the Grand Jury made a special presentment to the judge to the effect that murders and accidents arising from the administration of poison having become frequent, they thought it proper that steps should be taken to check the incautious sale of poisonous drugs. They, therefore, suggested that the Legislature should interpose to check such sales, unless they should be made to persons known to the vendor, or where they were introduced by parties known to him ; and that in all cases there should be a register kept of the vendors, and of the drugs sold.

Mr. Baron Alderson said that there were two difficulties in carrying into effect the recommendation of the grand jury, though he approved of their desire to check the sale of poisonous drugs. The one difficulty was, that a catalogue of poisons would be furnished to parties who were, perhaps, ignorant on the subject ; and the second was, that it was difficult to say what really were " poisons." Sir B. Brodie had informed him (Mr. Baron Alderson) that many medicines which were commonly administered by physicians were poisons, and the use of them would be absolutely prohibited.

Sir W. Middleton, the foreman of the grand jury, having listened to this exposition of his Lordship's views on the subject of the presentment, bowed and retired with " the thanks of the Court for his services."

[We fully agree with Baron Alderson and Sir Benjamin Brodie in the opinion, that much difficulty and inconvenience would attend the introduction of a comprehensive law for restricting the sale of poisons generally ; but if we may judge from the cases of poisoning reported almost daily in the public papers, there are good grounds for believing that a proper restriction on the sale of arsenic by retail would be the means of preventing at least nine-tenths of the cases of criminal poisoning which now occur.—Ed.]

LETTER FROM MR. FARMER.

Sir,—Many ineorrect reports relating to the late inquest at Putney having been promulgated to my prejudice, although I was fully exonerated from all blame by the coroner and jury, I should have requested the insertion of a few observations in reply, but abstain from so doing until the affair has undergone investigation in a court of law, in which proceedings have been already eommenced.

I am Sir, yours respeetfully,

High Street, Putney, August 20th, 1847. JOHN FARMER.

[We think Mr. Farmer need not trouble himself any further : he is under no imputation. We quote the following extract from a letter in the *Morning Post,* by a medical man who was on the jury :—

" Your correspondent's insinuation, that *the druggist's treatment of the late Miss Dallett was extended over a period of many days,* is not only untrue, but most uneandid. The family have this morning assured me that the Chemist was applied to but *twice* for medicines for their deeeased relative, viz., once

on the Sunday, and once on the Monday following. On both these occasions, I must do Mr. Farmer the justice to say, that I think the most rational remedies, all circumstances considered, were sent the deceased, and in this opinion I am borne out by that of my professional brethren who were examined at the inquest. Of two evils, it may be asked, which is the least? amateur practice, or Chemists' suggesting? Mr. Farmer satisfactorily explains the meaning of the term "suggesting," as used by him at the inquest, by stating that he is in the habit of pointing out what he conceives the most efficient pharmaceutical preparations of popular remedies, previously indicated by the applicants. He states that he did this in the case of the late Miss Dallett. A mercurial and an aperient were indicated, and he sent the mildest form of both, making the most minute inquiries (much to his credit) with a view of ascertaining whether there really existed anything more than the slight functional disorder suspected. If a Druggist does not go beyond this in his practice of medicine, he is surely rather to be commended than censured, for preventing ignorant parties from purchasing powerful drugs with the actions of which they may be totally unacquainted."

NEW WORK ON PRACTICAL PHARMACY.

We have much pleasure in announcing that a work on Practical Pharmacy, the joint production of Dr. Mohr, a well-known and eminent German Pharmaceutist, and Mr. Redwood, of the Pharmaceutical Society, is now in the press, and will shortly be published. The title of the book will be *Practical Pharmacy, comprising the Arrangements, Apparatus, and Manipulations of the Pharmaceutical Shop and Laboratory.* It will contain several hundred wood-cuts, a large number of which have been made exclusively for illustrating the matter which is introduced in the English edition, to adapt it for the use of Chemists in this country.

TO CORRESPONDENTS.

"*Beta.*"—Platinum cannot be fused by the heat of the most powerful furnace; it can only, by this means, be rendered soft and malleable, in which state it is beaten and welded, so as to give it the required forms.—(2.) See vol. vi. of this Journal, pages 277 and 329.

"*An Associate*" (*Doncaster*).—In making the acetous extract of colchicum, care should be taken to use a very moderate temperature. If much heated, it becomes gelatinous and opaque.

Z. Z. (*Leicester.*)—We cannot recommend the use of the dregs of tincture of opium for any medicinal purpose, although they generally contain morphia in small but uncertain quantities.

"*Juvenis.*"—If white and brown bread be made from the same wheat, the former differing only from the latter in its having had the bran and coarser particles removed, it is probable that the brown would contain the larger proportion of gluten, and would therefore be the more nutritious. This, however, would depend upon the degree to which the separation was effected, for the mere bran is indigestible, and therefore not nutritious. The finest flour is deprived of a portion of its gluten during its preparation; the starch, which is the less nutritious ingredient, being left.

J. H. H.—Bromine is obtained, like iodine, from the mother liquors, from which much of the salts contained in sea and some other saline waters have been separated. See any work on Chemistry.

"*Collegian.*"—Fownes's *Manual of Chemistry.*

H. W. (*Cheltenham.*)—We are not acquainted with any recognised formula for *Emplastrum iodinii compositum*, but have seen a similar preparation ordered, containing iodide of potassium, resin, wax, and oil. Elemi has also been suggested as a vehicle for the iodide, lead plaster being incompatible.

"*A Druggist*" (*Liverpool*).—As minims differ from drops, they should not be used when drops are ordered.

"*Amator Scientiæ.*"—(1.) See page 107.—(2.) In mixing seidlitz powders to be kept in one bottle, the ingredients should be separately dried before they are mixed. The dose is about ʒiij.—(3.) Acidulated kali, when prepared with citric acid and bicarbonate of potash is deliquescent, and soon spoils. This is not the case when made with tartaric acid and bicarbonate of soda.

A. W. R. S. (*Edinburgh.*)—The process for silvering mirrors by the precipitation of pure silver is noticed in vol. iv., pages 82 and 194.

J. C. (*Newport, Salop.*)—Fluid extract of sarsaparilla, or liquor sarzæ, see vol. vi., page 133, and some practical information on the extraction of the active principle of sarsaparilla will be found in vol. iii., page 250.

"*Felix*" (*Blackburn*).—Brunswick green, see vol. vi., page 138.—Yellow pigments, see vol. vi., page 177.—Red pigments, vol. vi., page 226.

"*Chemicus*" (*Portsmouth*).—Essential oil of bitter almonds, see vol. vii., page 11.

R. D. (*Cheltenham.*)—A Chemist who was in business on his own account before February, 1843, is eligible for admission into the Pharmaceutical Society without examination, on payment of an entrance-fee of two guineas. The annual subscription for country members is one guinea. For further particulars apply to Mr. Nathaniel Smith, Secretary for Cheltenham.

A.P.S., G.B. (*London*) must pass the major examination before he can be admitted as a Member, unless he was an Associate before July, 1842.

N.Q.Y. (*Liverpool.*)—We are not acquainted with the preparation sold as essence of rennet.

Tous les Mois.—We have received a communication from Dr. Hamilton, of Plymouth, on this subject, containing an extract of a letter from Mr. Cardin, who has for some years been an importer of the genuine *tous les mois* from St. Kitts, and who mentions the fact that it is too much the practice to adulterate this article with the sweet potato (*Batatas edulis*), which substitution has occasioned great disappointment in many cases, and tends to bring the *tous les mois* into disrepute. We intend shortly to give a woodcut of the magnified starch of the *Batatas edulis*, and of the *tous les mois*, for comparison.

A Member (*Sunderland*) informs us, that the Druggists in that town disclaim all participation in the letters purporting to have been written by a Sunderland Druggist, which have appeared in "the scurrilous publication." He doubts their having been written by any one connected with the trade.

B.W., M.P.S.—Registration of Designs. The Office of the Registrar is at 35, Lincoln's Inn Fields. The expense of registering depends on the kind of design or invention to be registered, so also do the privileges secured. A patent cannot be taken out afterwards. Our Correspondent had better write to the office for their printed regulations, which explain the whole matter. Had he given his name and address, we would have sent him one of these.

M.N.—Crystallized pomatum for the hair may be made by dissolving with a moderate heat 1 part of spermaceti in 16 parts of oil, and allowing it to cool very gradually without agitation.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. IV.—OCTOBER 1st, 1847.

MEDICINE AND PHARMACY IN RUSSIA*.

The medical administration of Russia is placed under the Minister of the Interior, and is divided into three divisions:—1. The Council of Medicine; 2. The department of Medicine; and, 3. The department for the preparation of Drugs for the Crown. The medical officers of the Army and Navy form a separate department, under the Minister of War.

The Council of Medicine consists of a President, three ordinary Members, with the Præses of the Imperial Medico-Chirurgical Academy of St. Petersburg, the Director of the department of Medicine, and the Director of the department for the preparation of Medicines for the Crown, a Chemist (or Apothecary), and an indefinite number of honorary Members. The functions of this Council are learned, judicial, and economic. 1. In their capacity as a *learned* body, they have the censorship over all medical books and publications; likewise over all medical discoveries, surgical instruments, quarantine establishments, the means to be adopted to prevent the spread of contagious diseases, &c.—2. *Judicially*, the Council superintend chemical analyses in cases of poisoning, and acts in all difficult civil and criminal cases.—3. *Economic.* The Council examine and correct the medical catalogues for the Army and Navy, and report upon the quality of the drugs delivered for the use of the State. The resolutions of the Council are carried out by the department of Medicine, which publishes an *annual registration* of all qualified medical practitioners in the empire—superintends all medico-forensic affairs; and, as the real or acting head of the medical profession, issues orders to the different medical cantons or divisions, receives the different reports concerning the state of health of the inhabitants, orders medico-topographical accounts from

* In the first volume of this Journal, we gave a short account of the laws relating to Pharmacy in Russia. The present statement relates to the medical profession generally, showing the relation between Pharmacy and the other branches. The facts are derived from the following authorities:—*Buchner's Repertorium of Medicine*, Munich; *Henke's Zeitschrift für die Staatsarzneikunde; Dr. Blosfeld*, Professor au der Universität zu Kasan; *G. Lefevre, M.D.*, Physician to the British Embassy, in *British and Foreign Med. Review; Niemann's Taschenbuch der Civil Medic.*, Leipzig; *Dr. Meissner's Bemerkungen während ein Reise in Russland*; *Most's Ausf. Encyclopädie der gef. Staatsarzneikunde*, and especially *Ulldall's Medicinal Statistik*, Copenhagen, 1847.

different parts to be prepared, regulates the prices of medicines, publishes Pharmacopœias, medical statistics, and directs attention to all civil hospitals, baths, quarantine and vaccination establishments, &c. &c.

3. The third department was formed in 1834, to superintend the preparation, preservation, and distribution of medicines and Drugs to the army, navy, and other public medical establishments.

In each of the respective chief towns of the provinces or governments, resides a Medical Council, called in St. Petersburg *a Physicate*, in Moscow, a Medical Bureau, or *Contoir;* but generally designated in the country "*Uprava.*" This Council consists of an inspector, an operator, an accoucheur, several Honorary Members, and, in the governments of the Caucasus and Siberia, where diseases among the numerous herds of cattle are common, a Veterinary Surgeon. These provincial Medical Councils are under the controul of the medical department, and are in communication with the police and military commanders of the repspctive towns. The medical inspectors of the Councils or *Upravas*, perform annual journeys through their provinces, and are Members of the Imperial Committee of Vaccination, as well as of the Imperial College of Health (*Collegium der allgemeinen Fürsorge*). All medical practitioners, whether private or public, as well as all Apothecaries and Midwives, are under the inspection of the *Uprava*, to whom they make their annual reports, concerning the health of the district, success in vaccination, &c., &c. The *Uprava* again makes an annual report to the Imperial department of Medicine over the state of the different Pharmaceutical establishments, prisons, lunatic asylums, dispensaries, hospitals, &c.

To the *Uprava* is also allotted the inspection of recruits for the army and navy, affairs of a medico-forensic nature, &c. The cantonal Physicians reside in the chief towns of the provinces, and attend *gratis* the poor of the districts, superintend the state of health in schools, manufactories, foundling hospitals, vaccination establishments, and report to the *Upravas* cases of medico-legal importance; chemical analyses in cases of poisoning, as well as decisions regarding persons in a doubtful state of mind, having, since 1825, been placed under the immediate controul of the *Uprava.* As a guarantee for impartiality, the investigations of the *Uprava* in doubtful cases of lunacy are public. In cases of death by poisoning, the cantonal Physician (*Kredslæge*) sends the suspected parts of the body to the *Uprava*, in whose presence an Apothecary (or Chemist) performs the necessary analysis. Each cantonal Physician has, according to the extent of his district, one, two, or three Assistants, one or two Midwives, and in some places a Veterinary Surgeon at his disposal.

Great numbers of Dentists exist in Russia, and act independently of the medical authorities. Barber-surgeons are common in the provinces along the Baltic, where, according to Dr. Blosfeld, they are extremely useful. They are permitted to bleed, cup, draw teeth, apply leeches, &c. In the other provinces, their place is filled by a class of surgical assistants called *Kostopraw*, educated for that purpose by the State. These *Kostopraw* are generally recruited from the foundling hospitals, and form a step in the military organization of the medical profession in Russia.

Dr. Lefevre says that Surgeons rank in the seventh, and Physicians in the eighth class of the Russian nobility, and that the military subordination is carried to such a ridiculous extreme, that even in the hospitals, the medical assistants are marched up and down under command like soldiers upon duty. The three Universities of St. Petersburg, Moscow, and Harkop (Charkow?) possess good medical schools, in which medical students are educated at the expense of the State, but expected to serve afterwards during six years either in a civil or military capacity. The number of these students vary in the different universities, that of Moscow educating 100. The Medico-Chirurgical Academy of St. Petersburg is the largest in the empire, and was founded by Catherine the Second.

In order to be admitted a student of medicine at one of the universities, proof of classical education is strictly enforced. The lectures are well attended and good. The course of study averages five years. The lectures include—1. Anatomy, general and comparative; 2. Physiology; 3. Natural Philosophy; 4. Natural History; 5. Chemistry; 6. General Pathology; 7. Pharmacy; 8. Materia Medica, Toxicology, and writing of Prescriptions (both in Latin and Russian); 9. Surgery; 10. Midwifery, including diseases of women and children; 11. Therapeutics; 12. Forensic Medicine; 13. Clinical Medicine and Surgery; 14. History of Medicine; 15. Veterinary Surgery. It must be observed that the highest degrees or honours seem generally to fall to the share of foreigners, the Russian students appearing to be as yet behind at their own examinations. The examinations are open to all nations, and the candidate may be examined in Latin, Russian, French, German, or English. He must have attained the age of twenty-four, and must have studied at some university from four to six years. A certain number of travelling fellows are annually sent to study medicine in the medical institutions of other countries, at the expense of the State. Although no distinction exists between the comparative merits of a Physician, pure Surgeon, and Obstetrician, the unity of medicine as an art being fully understood and acknowledged, still, by the Ukase of 1838, medical practitioners are divided into those of first or second

rank or class, according to the efficiency they display in passing their examinations, and their length of service in the State. Every thing in Russia being subject to military subordination, it may be readily supposed that the medical profession has felt the effects of this barbarous custom, and at the sick-bed of the patient the talented practitioner, without a ribbon attached to his button-hole, must often cede to the intriguing medical courtier who has been so fortunate as to have received such decorations. In private practice the condition of the medical man is not without its advantages.

There exists no practical distinction between the Physician and Surgeon. No medical man dispenses or sells drugs, but the English Physician settling in Russia, soon forgets his former habits and prejudices, practising medicine and surgery indiscriminately. The doctor is in private practice generally remunerated according to the means of his patient, and most commonly at the termination of the case, sometimes in money, at other times in presents of plate, gold snuff-boxes, rings, &c. Every medical man is by law obliged to attend any one demanding his services, but may charge five rubles (about 3*s.* 6*d.*) per visit. It is a very common thing for families to contract with their doctor for an annual payment to him for attendance, the amount varying from £10 to £100, or even more. Consultations are remarkably frequent, particularly among the higher classes. Surgical operations are well paid, and accoucheurs when called in, receive from £5 to £50 for their attendance, besides having the assistance of a regularly-educated midwife. Homœopathy is forbidden to be exercised by practitioners in civil or military offices. In a country where the great mass of the people is extremely bigotted and uneducated, and where there exists a powerful and rich nobility, no regulations can entirely exclude quacks and quackery, and we find, accordingly, that while the lower classes resort in their need to amulets, ceremonies, exorcisms, images of saints, and the never-failing *vapour bath*, the aristocracy delight in homœopathy, hydropathy, mesmerism, and other still more extraordinary curative methods. While the towns in Russia are almost too full of doctors, in large portions of the country scarcely one is to be found, and the people in those districts are dependent on a class of unexamined *practicantes* licensed by the Government. Public medical functionaries, whether in the civil or military service of the State, are miserably remunerated. A Physician-in-chief to a large hospital receives from £30 to £60, with lodgings, fuel, and candles, while an Assistant Physician is paid about half as much, but without the perquisites of the former. They are, however, allowed to practise on their own account, whenever their time allows of their so doing.

The Veterinary Surgeon occupies in the Russian system of medical education a higher position than in most other countries. His course of studies occupies about four years, and his examinations are strictly enforced.

The practice of Pharmacy is, in Russia, well regulated, and the Pharmaciens or Apothecaries are licensed by Government, and considered as functionaries of the same. They are divided into 1. *Wholesale* Druggists, with or without chemical laboratories, and 2. *Retail*, or those merely dispensing the prescriptions of medical men in their "*Apteka*," or shop. The first *Apteka*, or Apothecaries' shop, was opened in Russia by an Englishman named Fensham, in the year 1581. The prices of drugs and medicines are regulated by a tariff, and are exceedingly high; according to Dr. Lefevre, nearly twice as dear as in England. The Apothecaries are generally Germans by birth, and their number being limited by Government, there is in some places a deficiency of these establishments. The prescriptions of the doctors are never returned, but kept by the Apothecary, to be produced in case of necessity, and all medicines sent out are stamped with the seal of the *Apteka*, or shop. The greatest precaution is exercised with regard to the sale of poisons, and the medical prescriber signs his name in the *poison-book* kept in each *Apteka* for that purpose.

All Apothecaries, or Chemists and Druggists, are under the superintendence of a Physicate or Chancery, to which all matters of dispute are referred. The distinction between the Apothecary and Doctor is, however, so clearly drawn, and so closely observed, that very few cases of professional jealousy can occur between the two parties. Pharmaceutical examinations are well-classified, and in accordance with the progressive development of the nineteenth century. The duration of studies is three years, and the grades, or degrees, are divided into three classes. 1. The Assistant-Apothecary; 2. The Provisor or Superintendent; and 3. The Pharmacien or Apothecary. The first, or *Assistant*, is required to have served an apprenticeship of at least three years in an *Apteka*, and is examined in 1. *Botany*—terminalogy and principal systems. 2. *Mineralogy*—terminalogy, principal systems, and chiefly those minerals belonging to Pharmacy. 3. *Physics*—the general properties of bodies. 4. *Chemistry*—metals, oxides, salts, preparations employed in medicine, simple non-metallic bodies, &c. 5. *Zoology*—different systems, and chiefly those animals employed in medicine. 6. *Pharmacology*—the ordinary doses of the more active medicines. 7. *Pharmacognosy* (Materia Medica)—the agents most commonly employed—their origin, denomination, and peculiar distinct characters. 8. *General Pharmacy* — with a knowledge of Latin. 9. Chemical analysis.

The second degree, or the *Provisorship*, is attained by the

Assistant after having served two or three years in a shop. He must likewise have followed a complete course of Pharmaceutical studies at an academy or university. He is then examined in the same sciences as those already enumerated, but more severely.

For the third or highest degree, that of Apothecary-in-chief, the candidate, after having already passed the examinations as Assistant and Provisor, must furnish proof of having acted as such during two or three years (according to his order in passing). A greater severity is observed in passing this last ordeal, which comprises the same sciences above-mentioned, together with a knowledge of commerce and book-keeping. By a general edict, all Apothecaries are prohibited from prescribing or interfering in the treatment of the sick, excepting in cases of sudden emergency, such as poisoning, hæmorrhages, burns, fainting, &c., and where the immediate attendance of a qualified medical practitioner cannot be obtained.

KEW GARDENS AND MUSEUM OF VEGETABLE PRODUCTS.

THE important improvements now in progress in the Royal Gardens at Kew may be mentioned as one illustration, among many, of the prevailing disposition on the part of Her Majesty and the Government, to encourage every branch of education. These gardens, which two hundred years ago were private property, and subsequently became the property of the Crown, were transferred by Her Majesty to the department of the Commissioners of the Woods and Forests, in the year 1840, at which time they were thrown open to the public under certain regulations. The grounds consist of three portions: First, the Royal Botanic Garden, comprising about sixty-four acres, to which has recently been added the Royal Kitchen Garden of fourteen acres; Second, the Royal Pleasure Ground, 170 acres; and third, the old Royal Deer Park, about 400 acres.

The Botanic Garden is divided into several compartments for the convenient arrangement of the various classes of plants, and has numerous hothouses and conservatories containing a very valuable collection of exotics. All the plants are named and classified in such a manner as to afford every facility to the student, and the communication existing between this establishment and foreign countries throughout the globe, is the means of introducing from time to time new and interesting plants, which are cultivated and naturalized for the benefit of the public. During the past year upwards of 4000 plants of different kinds have been dispensed from the garden.

For some time prior to the year 1840, admission might be ob-

tained on certain days by proper application to the authorities; but this afforded a very limited accommodation to the public. Since the gardens have been thrown open, the number of visitors has increased by several thousands each year. In 1841 the number was 9,174; in 1846 it was 46,573. The gardens are open every day, except Sunday, from one o'clock to six, and even at an earlier hour than one, any respectable persons coming from a distance, in ignorance of this regulation, may obtain admission. We think an extension of the hours generally would be an advantage to the public, as one o'clock is rather late in the day to visit a botanic garden. To those who delight in rural pursuits the morning hours are most appreciated, before the heat of the sun has become oppressive, while the afternoon is the time appropriated to the promenade by the fashionable world who keep late hours. According to the existing regulations the privilege of early admission could only be enjoyed once, as no person could on his second visit plead ignorance of the regulations.

A portion of the garden has recently been appropriated to medicinal plants, and the Council of the Pharmaceutical Society have, on several occasions, been favoured with specimens for the illustration of lectures and examinations.

A new feature of interest is about to be added to this very useful establishment, namely, a MUSEUM OF VEGETABLE PRODUCTS. We shall therefore have the opportunity of examining on the spot, not only the plants in the living state, but preserved specimens, and all the various products in every stage of their manufacture. In this collection the Materia Medica will occupy a conspicuous place, and we look forward with much interest to the completion of the undertaking. Such a combination of advantages has long been a *desideratum* in this country, and it should be our ambition to rival the Garden of Plants in Paris. When we consider the space at command in Kew Gardens, the facility of access, and the zeal with which Englishmen generally embark in undertakings of this description, there is every reason to hope that this establishment will sustain the national character.

Although the Gardens are maintained by the Government, there is ample scope for private influence and liberality. The nucleus of the Museum of Vegetable Products has been presented by the director, Sir William Hooker, whose zeal and energy in the furtherance of the objects of the establishment are worthy of imitation. The Pharmaceutical Society and Kew Gardens are in a position to afford mutual assistance to each other; for while our Museum and the Members of the Society may be considered the fountain head of medical products, the gardens and conservatories, enjoying the advantage of Government support and extensive foreign correspondence, may furnish an abun-

dant supply of living specimens; and thus not only provide the student with a tangible source of instruction, but clear up many doubtful points in the natural history of drugs. We may hope to see flourishing in our own country specimens of the cinchonas, the kino-tree, the sarsaparillas, and numerous other plants and trees, yielding officinal barks, expressed juices, or other products, respecting the sources of which some further evidence is desirable. The blanks in the Materia Medica department of the Pharmacopœia will thus, by degrees, become filled up, and this alliance between Botany and Pharmacy will lead to important results in the advancement of science.

RANDOM PRESCRIBING.

While it is admitted that Medical Practitioners are fully at liberty to prescribe new remedies and preparations not contained in the Pharmacopœia, it is their imperative duty in thus deviating from the officinal code, to give explicit instructions respecting the nature and strength of such articles. The frequent practice of ordering strong and dangerous medicines in a loose and indefinite manner places the Chemist in a very unfair position, and is attended with much danger to the patient. For instance, when solution of morphia, or any of its salts, is ordered and the strength is not defined, the Chemist has no clue to the real meaning of the prescriber: he must either use his own judgment as to the dose, or delay the preparation of the prescription, much to the inconvenience of the patient, while he is waiting on the doctor to request that he will supply the blank.

The responsibility of the former alternative may be understood when we observe, that there are three solutions of the several salts of morphia in use. Magendie's formula contains two grains of the salt in a drachm: a second, quite as generally used, is half that strength; and a third corresponds with the strength of laudanum, an ounce containing six grains (according to some authorities five—others four and a half grains).

The following is a specimen which came before our notice a few days ago:—

℞ Tinct. Aconiti, ℥iijss.
Sol. Sulph. Morph. (amorph) ℥ivss.
Ether Chloric, ℥ij.
A teaspoonful in a large wineglass of water three times a day.

In this prescription, two preparations out of three, *and both strong poisons, are ordered at random.* No human being could possibly guess what strength was intended. The probable result of employing a stronger preparation than was intended would be the immediate death of the patient.

The dose of morphia varies from a minute fraction of a grain to two or three grains, according to the constitution and habits of the patient, and the nature of the complaint. Some persons can swallow at a draught an ounce and a half of laudanum, while to others a drachm would be a fatal dose. Yet the Chemist, without knowing the circumstances of the case, is expected to prepare the prescription accurately, while the dose of the active ingredient is left entirely to his discretion.

Then, with respect to the tincture of aconite, how is this to be prepared? In another part of this number we have given several tinctures of aconite. The dose of the mildest of these tinctures would be about thirty or forty drops, of the strongest a drop or two—the maximum dose five drops. The employment of one of the strong formulæ, when the mildest was intended, might produce almost instant death. And who is to be responsible? The prescription may be brought to one Chemist to be prepared, and he may send to another Chemist for the tincture. The patient dies—who is to blame?

We strongly recommend every Chemist, when a prescription is brought to him in which tincture of aconite is ordered without directions as to its strength, to pause before he prepares it. A coroner's inquest is a very serious matter.

If it be asked, how then should such remedies be prescribed? the answer is plain: Give the formula for the solution or tincture at the top of the prescription—a practice usually adopted by some medical men; or publish the formula and refer to the Journal, or other work in which it is published, stating on the prescription the volume and page where it may be found. The former is the most unexceptionable plan, and surely the trouble of writing two extra lines on a prescription ought not to be considered a hardship when the life of a patient is at stake.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Allow me, through the medium of your Journal, to give a short letter to my much-respected brethren on the too frequent source of complaint, namely, the manner that some of the professional gentlemen write their prescriptions. It is a daily complaint made by Chemists and Druggists, that the profession do not write their prescriptions plainly—that it is very difficult to understand the true meaning of the prescriber; either the words are unintelligible, or the full directions are not or cannot be understood by any person. I have to remark, what many have said before, that in such cases, if the prescriber is not far distant, it is best to call personally upon him and plainly ask him what is meant; but if too far off the dispenser is left to his own judgment to put right or wrong as his fancy may dictate, and as such dangerous practice is daily occurring, it is only surprising that it does not give rise to more serious results.

As an example the following prescription will suffice :

℞ Creasoton, mj. i—x.
Mucilag. G. Acaciæ, ʒi.
Acid Hydrocyan, mj. i—x.
Liq. Potassæ, mj. xx.
Potass. Hydroid, gr. ii.—x.
R. Digitalis, mj. x.
R. Scillæ, mj. x.
Spt. Æther. Nitros, ʒss.
Aq. Destillat., ʒx.
Ft. Haust ter die sumend.

The above prescription was sent to be made up, and had been dispensed previously at another shop. No further directions than the above were given with it. Are Chemists to use their own discretion in such dangerous compounds, and to risk their own safety, or is there a way of avoiding the danger ?

Supposing the above to be made up at four or five shops, is it not next to an impossibility that each person could put the same quantity of every ingredient ?

Let me mention another great cause of annoyance to some parties, that the mixture or lotion (as the case may be) is not of the same colour or taste as that which has been prepared by another Druggist, therefore suspicion is created that it was not correct. It is very wrong for Druggists to prepare articles from extemporaneous recipes of their own, instead of making them according to the established form. If such practices are carried on, which I have reason to believe is the case, what is the use of a Pharmacopœia ? Such persons put themselves in great danger. In case any serious or fatal consequences be the result, would the person not be as much in fault as a person vending a quack medicine ? I should say it is worse. As examples of such frauds, I give the following :—Soap liniment, paregoric elixir, decoction of aloes, emplast cantharidis, &c. &c., which are not unfrequently prepared according to private formulæ. The following was lately made up by me according to the Pharmacopœia :—

℞ Lin. Saponis, ℥iijss.
Tinct. Iodinii Co., ℥ss.
Ft. Linimentum.

The party applied the following day, complaining of the difference in colour from what he had before, some of which was brought for inspection. The liniment was made up with soap liniment prepared with soft soap instead of hard soap, and the potash, in the soft soap, had destroyed all the colour of the iodine.

It was made up by me with the soap liniment according to the proper formula, and it was of a dark colour, as it naturally should be. Such complaints can never be obviated until Druggists adhere strictly to the Pharmacopœia ; all Druggists in so doing will have preparations of an equal strength. The trade cannot be brought to a better state until all such grievances are removed, which, when we look to the root of the matter is the principal evil of all. Many instances of a similar nature may be pointed out if necessary. I conclude, trusting that no person will feel hurt at the above remarks. Yours, respectfully,

JOSEPH COOPER.

Ramsgate, Sept. 16, 1847.

PHARMACEUTICAL DIPLOMAS.

Much discussion has prevailed ever since the establishment of the Pharmaceutical Society respecting the diploma, and our notice is especially directed to the subject by a letter recently received from a correspondent, who informs us that he resigned his membership on account of the display of diplomas by some disreputable and unqualified persons, in their shop windows. He mentions a case which has come before his knowledge, as follows :—

"A person named ———, who, from a carrier-out of Surgeon's medicines, grew at length into a dispenser thereof, took a faded Druggist's shop at ———, (we omit the name and address) and was forthwith dubbed a Member of the Pharmaceutical Society of Great Britain, though he had never been behind a Druggist's counter before. As an instance of his proficiency, a servant was sent to him for some prepared hartshorn for cleaning plate, and returned with a packet of hartshorn shavings, which was sent back, but again given with the message, that this was the only prepared hartshorn he knew.'—"The same individual likewise attends midwifery cases at 2*s.* 6*d.* each. In December, 1845, a coroner's inquest was held on the body of a young woman who had fallen a victim to his ignorance."

Our correspondent observes, that in this, and some other cases, the diploma, instead of being a proof that the possessors are duly qualified to practice Pharmacy, is merely evidence of a desire to pass for something learned, and deceive the public. He continues,—

"Now if such parties be incessantly brought before the public on labels and handbills as Members of the Pharmaceutical Society of Great Britain, with diplomas conspicuously paraded before the gaze of wondering ignorance, will not men with somewhat higher pretensions disdain to be one with them ? Would they not rather disclaim membership ?"

This is certainly a strong case. The admission of such a person was an oversight, but it is one which is not unlikely to occur in a young society, comprising members in remote parts of the country, respecting whose history it may sometimes be difficult to obtain complete evidence. But we cannot altogether agree with our correspondent in the conclusion that, because one, or even a dozen persons of the above class, may have obtained admission by accident, that it is on this account imperative on all respectable members to withdraw from a society the object of which is praiseworthy, and its tendency beneficial.

We saw this morning on a screen by a public-house a disgusting hand-bill. The words Member of the Royal College of Surgeons attracted our notice on passing, and we halted for a moment to see how a member of that learned body could have found his way into such a place. It was an advertisement headed "beware of imposition," and advising patients afflicted with certain disorders enumerated, to hasten to a certain "Member of

the Royal College of Surgeons," for a safe and speedy cure—secrecy observed—charges strictly moderate.

Now, if the respectable Members of the College of Surgeons were to act upon the principle that it is degrading to belong to a body because some of its members are disreputable, they would, on observing such an advertisement, resign their membership and return their diplomas. Who then would be left in the College? Only the few disreputable impostors who adorn the screens of public houses with obscene handbills, and caution the public to "beware of imposition!" It is indeed surprising that an ancient and powerful body like the Royal College of Surgeons should allow a man to continue a member after he has thus outraged common decency, but it is not so easy for a society within six years of its formation, to exclude from its ranks every individual whose character is not unblemished. During what may be termed the period of incubation of a society of this description, there must of necessity be a variety of shades in the character of its members, and if every respectable member were to withdraw on this account, who would be left in the Society? only the few disreputable persons who had been admitted by accident, and who ought to be weeded out instead of being left sole and undisputed possessors of the ground. This line of proceeding would bring to destruction any institution—frustrate and render abortive any useful project.

We advise our correspondent, and others who have come to a similar decision, to reconsider their verdict, and, instead of leaving the camp in the hands of the enemy, to put their shoulders to the wheel, and increase the strength of the camp, in order that the enemy may be ejected.

The PHARMACEUTICAL SOCIETY was designed as a means of raising the qualifications of Pharmaceutical Chemists, and placing between them and unqualified persons a line of demarcation. The diploma was intended as a distinctive mark for the information of the public. It was not, in the first instance, intended as a mark of absolute qualification, and it was stated at the time that it would be some years before it would assume this character. But precautions were taken from the beginning to exclude all persons known to be disreputable or unworthy of being classed with the general body of Chemists and Druggists; and although, in a few instances, the vigilance of the Council in this respect may have been eluded, the certificate may, at all events, be taken generally as a test of respectability. It also denotes that the possessor is one of those who has united with others in the endeavour to raise the qualification of his class, and it cannot be denied that the leading Chemists, not only in London but in most provincial towns, are on the list of Members. An exclusive society, consist-

ing only of those who might be willing to undergo the examination, would have done little or nothing towards the accomplishment of the grand object in view, namely, the improvement of the whole body: and in throwing open the door to all respectable Chemists, it would have been unwise to create an invidious distinction by withholding the certificate of membership from a large majority of the Members, a course which would inevitably have created so much dissatisfaction as to break up the Institution. The probable abuse of the certificate in some cases was anticipated, but this evil was considered to be less than that of creating general discontent among the Members, on whose support the Institution depended for its success.

It is obvious that the undertaking could not have been accomplished by any other method than that which was adopted, namely, by conceding to every respectable Chemist that rank in the Society which the law had already given him in his trade. On looking back at all that has been done, we see nothing to be regretted in the plan itself, under the peculiar circumstances of the case, although we regret the fact that among the long list of Members, a few improper persons have gained admission. For this oversight there is a remedy, as the Council have power under the Charter to expel such persons, and in several cases in which official information has been given, supported by proper evidence, the subscriptions have been returned, and the names of the parties erased from the list. But if those who are dissatisfied, instead of bringing such cases officially before the Council, withdraw from the Society, the opportunity of exercising this wholesome provision of the Charter is lost. Even in the absence of this remedy, time will cure the evil. As the Charter provides that no person can be admitted as a Member without examination, unless he was in business on his own account before February 19, 1842, it is obvious that all our present Members have either passed an examination or have been in business nearly six years, and as all persons admitted under the above exception must be certified and recommended by two Members of the Society, the introduction of disreputable persons in future would be scarcely possible. Every year will add to the experience of our present Members, and increase the proportion of Members admitted by examination, until the entire revolution has been effected.

The original Members may be compared to the scaffold employed in the erection of a building. In less than twenty years we may expect that most of our original Members will be off the stage, and in leaving the scene of action, it will be a source of satisfaction to them to reflect, that they have been instrumental in raising up a race of successors, as much superior to themselves as an edifice is superior to the scaffold, by means of which it was erected.

ADVICE TO STUDENTS.

If it were possible for a man to live the last twenty years of his life over again, how gladly would many of the Chemists of the present day avail themselves of the opportunities of instruction now within the reach of the Pharmaceutical student. Fifteen or twenty years ago, the then rising generation of Chemists and Druggists had no beacon to direct their steps in the pursuit of knowledge. No course of instruction, beyond the mechanical routine of the shop was pointed out to them as the proper and legitimate means of obtaining a qualification for their business. Some, it is true, availed themselves of the opportunity which they happened to enjoy, of attending a course of lectures on Chemistry at a medical school or scientific institution, and in so doing, considered that they were stealing a march on their brethren, the majority of whom contented themselves with the conventional means of learning their trade. We have met with a few who so far appreciated the importance of education, as to go through a regular course of study, embracing even a general knowledge of therapeutics and medical practice; but these may be taken as rare exceptions to the general rule.

Botany was scarcely included among the studies recommended to the Pharmaceutical apprentice, for although it was admitted that a general acquaintance with this science might have its advantages, an apprentice who showed a disposition to study it methodically, would rather be cautioned against allowing the love of science to interfere with business habits, than encouraged to acquire the knowledge as a part of his education. The same observation was frequently made with reference to Chemistry, a scientific Chemist being considered unlikely to turn out a good counter-man.

These were the principles usually inculcated among the present race of Chemists during the time that they were learning their business, and under such disadvantages, nothing more could be expected than the production of a race of good tradesmen. On looking back at years that are past, we are fully sensible of the defects in the system, and the loss of valuable time, which ought to have been occupied in properly-directed studies. It is a loss which cannot be repaired, for it is impossible among the pressing avocations of business in after life, to devote that time which would be requisite in order to repair the deficiences of early education. This conviction naturally gives rise to a desire that those who follow our steps may enjoy greater advantages, and may be induced to avail themselves of them.

The founders and most active promoters of the Pharmaceutical Society have always had this object in view. They have

always desired to see the trade of a Chemist and Druggist raised to a position in accordance with the nature of the occupation. Although not recognised as a profession, the safe and efficient performance of the duties it embraces, involves a knowledge of science which raises it to a rank superior to an ordinary trade, and entitles the qualified Chemist to enjoy a corresponding position in society. To the rising generation we must look for the completion of this object, and while all may participate to a certain extent in the general advancement of knowledge, it is the student in particular who has the opportunity of building his future success on the solid foundation which the early cultivation of his mind can alone afford.

We, therefore, cannot too strongly impress upon the minds of those apprentices residing in London, the importance of attending lectures either at the house of the PHARMACEUTICAL SOCIETY, or, if more convenient, at a neighbouring medical school, where Chemistry, Botany, and Materia Medica are taught. It is a duty which they owe not only to themselves, but also to their brethren in the country, for although the march of improvement originates, like many other branches of reform, in the metropolis, we look forward to the extension of its influence in other parts of the country. But if the School of Pharmacy in London should fail to enjoy the support of those for whose benefit it is established, the prospect of maintaining branch institutions in the country could no longer be entertained. Some encouragement is afforded by the proceedings of our brethren in Bristol, and we have much pleasure in publishing in this number a lecture delivered before the Bristol Association, by one of the late pupils of the Society at Bloomsbury Square.

As a tree is known by its fruits, so the character of a school is sustained by the proficiency of those who have been educated within its walls, and we hope to have the satisfaction of recording many other indications of the progress of students, who, in raising their own character, reflect credit on the school in which they have been educated.

While we are endeavouring to point out the importance of education to young men, we trust that the disposition on their part to exert themselves will be met by a corresponding indulgence on the part of their employers. Nothing tends so much to raise the character of a shop as good drugs and qualified Assistants, and it is policy to make any reasonable sacrifice to attain these two objects as the foundation of a good business.

We observed the following extraordinary advertisement in the last number of this Journal: "A young man of good character, wishing to attend the lectures of the PHARMACEUTICAL SOCIETY,

and who would consider that privilege an equivalent for his services for six months, may apply to T. B., 76, York Street, Westminster."

Supposing the salary to be £30 per annum, the young man is to forfeit £15 for an hour and a half daily, or one-eighth of his time;* in other words, he is to sell his whole time at £30, and buy part of it back again at the rate of £240 per annum! and he is to pay this price for making himself more qualified, and therefore more useful to his employer.

We should recommend quite an opposite course: encourage industry and studious habits, promote the attendance on lectures, and, when a young man passes the examination, raise his salary. Let it be understood that a certificate of examination is a possession worth five or ten pounds a year, and this will have the effect of raising the qualification of Assistants almost as much as an Act of Parliament.

LECTURE

ON THE

INTIMATE RELATION WHICH EXISTS BETWEEN THE DIFFERENT DEPARTMENTS OF THE SCIENCE OF CHEMISTRY;

DELIVERED BEFORE THE

MEMBERS OF THE BRISTOL CHEMISTS' ASSOCIATION,

On Tuesday, August 3d, 1847.

BY MR. G. F. SCHACHT, OF CLIFTON.

I AM perfectly aware that in attempting the task I have this evening undertaken, I lay myself open to the charge of presumption; but my reason for selecting this subject was, not that I expected to do proper justice to it, but that, having the honour of reading before your Society the first (as I hope it will prove) of a long series of papers, I thought more benefit would probably result from the consideration of a subject necessarily involving some general views of that science in which we are all so much interested, than if our attention were more exclusively directed to the examination of *one* principle, or of *one* class of phenomena. My object then will be to endeavour to show that the distinctness of the various departments of the science is more apparent than real—that the divisions we are accustomed to are useful, more from offering certain conveniences for study than from being absolute in themselves, and that in fact a principle of unity can be clearly traced, dovetailing, reconciling, and assimilating all that at first sight seems opposed. To some it may appear that this matter is scarcely worthy of discussion; but I fancy that from the system adopted by most authors and

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* If the privilege in question had included attendance as a laboratory-pupil during eight hours of the day, the case would have been very different; board and lodging being considered the equivalent for the remainder of his time. Such an arrangement is rather advantageous to the student.

teachers, the student, if a beginner, is apt to suppose the science cut up as it were, into members, each possessing a certain identity, and capable of separate study. This chance of error should be carefully avoided; for, as in the human frame, though each member has certain functions and attributes, in a measure peculiar to itself, throughout may be traced that intimate relation, mutual dependence, and general submission to a governing principle, which is essential to the preservation of its integrity. So in the science of Chemistry, the tendency of discovery is to prove the existence of certain great and simple laws, which equally affect and controul all its operations, though some of their ultimate or remote effects *may* present certain variations.

The subject properly considered in all its branches would, I fear, far exceed the limits both of my powers and of your patience. I shall therefore confine myself to one position only, hoping at the same time that sufficient will be shown to put the student on his guard against the formation of erroneous opinions, and happy if it induces him to examine "whether these things be true."

Most authors on Chemistry arrange their subject under two grand divisions—organic and inorganic Chemistry. Most lecturers follow the same plan; nay, sometimes separate these so decidedly, as to consider them under two distinct courses. I have not the smallest intention of finding fault with this system, but would merely again remind you that it should only be adopted from motives of convenience, and I would further inquire whether such a dark line can really be drawn, or whether here and there a little shading on either side would not be more correct?

Organic Chemistry includes the examination of those bodies that are derived either directly or indirectly from the animal and vegetable kingdoms.

Within the province of Inorganic Chemistry are considered the elements, and most bodies that we are able synthetically to produce.

The first great difference between the phenomena of these two divisions that strikes the observer's notice is, the great complexity of those of the former in comparison with those of the latter. And the next in some measure accounts for this, that about fifty-five elements are concerned in the constitution of the *in*organic kingdom, whereas the mass of the other kingdom is formed from only four elements —carbon, hydrogen, nitrogen, oxygen, with the occasional and very rare assistance of phosphorous, chlorine, and sulphur.

To illustrate the first of these differences, let us compare a few of the compounds of the metals with some average examples from Organic Chemistry.

Ag = Silver.
$Ag + O$ = Oxide of Silver.
$Ag\,O + N\,O_5$ = Nitrate of Silver.
$Ag\,O + S\,O_3$ = Sulphate of Silver.
$Ag + Cl$ = Chloride of Silver.
$Ag + I$ = Iodide of Silver.

Here it will be seen that what is termed a binary plan of combination is observed throughout, and indeed the most complicated examples we could select from this department, may be shown to be built up as it were, of a succession of pairs of elements, thus:

K O	Potash	Sulphate of Potash	Double Sulphate of Potash and Copper.
S O_3	Sulphuric Acid		
S O_3	Sulphuric Acid	Sulphate of Copper	
Cu O	Oxide of Copper		

In Organic Chemistry on the other hand, the paucity of elements is compensated for by the almost infinite variety of proportions in which they combine, rendering the study of this portion at first much more difficult and troublesome. Let us take the three elements, carbon, hydrogen, and oxygen, and notice a few of the compounds produced by their union.

C	H	O	
24	22	22	Cane Sugar.
24	20	20	Starch.
4	6	2	Alcohol.
4	4	4	Acetic Acid.
14	6	2	Oil of Bitter Almonds.
14	5	3	Benzoic Acid.
8	6	12	Tartaric Acid.

Now we here altogether lose sight of the binary plan of combination. On the contrary, the elements have all the appearance of being bound together as a whole.

This appears a wide distinction, and quite sufficient to justify the separation that has been made between these two departments, but we shall find that there are one or two bodies (the list is certainly very small) properly belonging to Organic Chemistry, whose constitutions are as simple as any in the other division. Thus,

$C_2\ O_3$ = Oxalic Acid
N C_2 = Cyanogen,

are equally simple, with C O_2 carbonic acid, and N O_2 nitric oxide, but these instances, it is confessed, are few in number.

Yet upon examining those before mentioned, we shall find that though in the first steps of the formation of an organic compound a degree of complexity does certainly exist, yet, in its after combinations, the same simplicity is observed that characterizes the combinations of the inorganic kingdom. Thus, with reference to the organic acids, such as the tartaric and citric, their composition is somewhat intricate, but all their combinations with the metallic oxides, occur as completely according to the binary system as those of sulphuric acid do.

And further, the class of bodies called *alkaloids*, of which morphia may be considered the type, highly complex themselves, neutralize and combine with acids, almost as energetically as potash and soda, precisely according to the same laws, and are capable of as complete separation by similar chemical methods.

But perhaps the strongest comparison may be drawn between the metallic compounds and a class of organic bodies of apparently the *greatest intricacy*, amongst which has been traced a method of combination precisely identical with the binary system of Inorganic Chemistry. To explain this, I will select from several diagrams I have here, one or two series with which we are all more or less acquainted.

Cl = Chlorine	C_2 N = Cyanogen = Cy.
Cl H = Hydrochloric Acid	Cy H = Hydrocyanic Acid
Cl Ag = Chloride of Silver	Cy Ag = Cyanide of Silver
Cl Hg = ————of Mercury	Cy Hg = ————of Mercury
Cl O_5 = Chloric Acid	Cy O = Cyanic Acid
Ag = Silver	C_4 H_5 = Ae. = Ethyle
Ag O = Oxide of Silver	Ae O = Ether
Ag O + H O = Hydrated Oxide of Silver	Ae O + Ho = Alcohol or Hydrated Oxide of Ethyle
Ag Cl. Chloride of Silver	Ae Cl = Chloride of Ethyle
Ag I = Iodide of Silver	Ae I = Iodide of Ethyle
Ag Cy = Cyanide of Silver	Ae Cy = Cyanide of Ethyle
Ag O, NO_5 = Nitrate of the Oxide of Silver	Ae O, NO_5 = Nitrate of the Oxide of Ethyle

You will remark here the exact similarity of the two series, in the one case the radical being an element, and in the other a compound; but it must be remembered that although the metals are called *elements*, it is quite possible they may yet be decomposed. Should this ever occur, the parallelism between the two series will be perfect. It may be objected that these compound elements as they might be called (the scientific term is salt-radical) are mostly hypothetical bodies; yet it must be remembered that there are several bodies whose existence all allow, which yet were never isolated. Such are nitric acid, oxalic acid, fluorine, &c., therefore, if we refuse to believe in the existence of all bodies that we cannot see in an independent form, we must deny these latter substances also. Thus we see that the simplicity of the binary system of Inorganic Chemistry extends also to the other department of the science, and though we cannot prove its influence to be, in the latter case, so general as it appears to be in the former, yet that it is very important cannot for a moment be doubted. Let us now turn from a consideration of the *constitution* of bodies contained in these two divisions, to the methods employed in analysing them. Having in some measure seen how they are put together, let us see how they are taken to pieces.

These processes are generally described as though perfectly distinct matters, sometimes, indeed, forming separate works. We shall find, I think, that no new principle is employed, but only that the circumstances are modified, and that different apparatus is used. What is the philosophy of chemical analysis? It appears to be this: Giving a sample of some body whose composition is unknown. Present to it under proper conditions other substances, whose methods of combination are *well-known*, and from the new bodies, should any such be produced, estimate the nature and proportion of the ingredient abstracted from the sample. To illustrate this by an example from Inorganic Chemistry, suppose a crystal of sulphate of iron is offered for examination. We first arrange the circumstances. A few preliminary trials convince us of its nature; we then add excess of ammonia to a solution of a weighed quantity, because we know that the sulphuric acid will combine with the ammonia, and set the oxide of iron free, which, being insoluble, will be precipitated. This is, with proper precautions, separated and weighed. The sulphuric acid can then be estimated by adding to the solution of sulphate of ammonia, now formed, a soluble salt of baryta, because we know that a mutual and

powerful affinity exists between this body and sulphuric acid, and that the compound formed being insoluble in water, can be separated, washed, and dried, and from knowing its composition, the proportion of sulphuric acid can be arrived at.

Now in *organic* analysis the principle is exactly the same; for instance, to analyse sugar we weigh a certain portion, and mix it under certain conditions with a large excess of oxide of copper. This is placed in a proper glass tube, sealed at one end, and at the mouth furnished with a second tube, containing dry chloride of calcium; and beyond this a little apparatus containing a solution of caustic potash. When all is properly arranged the tube is heated and the sugar burned; the oxide of copper furnishes oxygen, which combines with the carbon of the sugar to form carbonic acid, which is absorbed by the solution of potash, and another portion of the oxygen combines with the hydrogen of the sugar to form water, which is collected in the chloride of calcium tube, this latter substance having an extraordinary affinity for water. These two parts of the apparatus being weighed both before and after the experiment, the proportion of carbon and of hydrogen can be calculated; these added together, and deducted from the original weight of the sugar, necessarily gives the weight of the oxygen contained in it.

Thus I think this puzzling complexity, and its consequent distinction from the simplicity of other portions of the science, disappear in proportion as we penetrate the surface of the philosophy that governs it. Those doctrines generally considered under, and exemplified from, the inorganic kingdom, may be found to exert similar influences in the other department, and *vice versa*. Thus in studying electrolysis, which is the decomposition of bodies by electrical agency, though the major part of our experience is derived from experiments on metallic compounds, yet the subject is certainly capable of illustration from the organic kingdom (witness Daniell's and Miller's experiments on the electrolysis of some of the ferrocyanogen compounds), and on this subject I feel rather sanguine, from my own experiments, that judicious investigation in this almost untrodden field of inquiry would establish on a firmer basis the theory of the salt radicals, and serve materially to generalize the science. The doctrine of isomorphism equally affects organic and inorganic substances, and even isomeric bodies, such as turpentine and essence of lemons, appear to have their analogy in the diamond and charcoal.

In the list of that class of actions grouped together as cases of disposing affinity are found examples from both kingdoms; as *inorganic* instances I may adduce the following:—Metallic silver does not oxidize in the air at any temperature, on the contrary, its oxide is easily decomposed by simple heat; yet, if the finely divided metal be mixed with silica and a little potash, and heated to redness, the whole fuses, the metal oxidizes and becomes converted into silicate of silver. Platinum is still less oxidable than silver, yet it is strongly attacked by fused hydrate of potash, a compound being formed in which the oxide of platinum (formed from the oxygen of the water under the disposing influence of the base) acts the part of an acid.

Examples of this strange influence in Organic Chemistry are perhaps more easily found. Thus, if acetate of soda, hydrate of potash, and quicklime are mixed and heated, a compound gas, consisting of carbon and

hydrogen, and known as "light carburetted hydrogen," or "marsh gas," is one of the invariable products: the reaction consists in the conversion of the acetic acid by the aid of the elements of water into carbonic acid and light carburetted hydrogen, the attraction of the potash for carbonic acid being the determining cause. Again, if the oil of potato-spirit be mixed with a large excess of hydrate of potash and lime, and heated to between 200° and 300°, the oil is decomposed, and under the disposing influence of the strong base, converted, with the aid of the elements of water, into Valerianic acid, which combines with the alkali to the formation of a tolerably fixed salt.

Katalytic actions are detected among the so-called simple phenomena of Inorganic as well as in the more complex group of Organic compounds. Indeed, the great and fundamental principles of chemical combination pervade every part of the science, and prove the existence of so intimate a relation between them, that no doubt can remain of the perfect unity and harmony of the whole.

A few words of the late Professor Daniell may, perhaps, as coming from a high authority, serve to enforce this position. Speaking of the connexion of the physical sciences, he says,

"In such a general survey the student perceives that science is a whole, whose source is lost in infinity, and which nothing but the imperfection of our nature obliges us to divide. He feels his nothingness in his attempts to grasp it, and he bows with humility and adoration before that supreme intelligence who alone can comprehend it, and who in the beginning 'saw every thing that he had made, and behold it was very good.'"

[We have also received a lecture delivered by Mr. Giles, a notice of which we must defer until next month.—Ed.]

M. LEDOYEN'S DISINFECTING FLUID.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—Public attention having recently been much drawn to the subject of disinfecting liquids in general, and to those of M. Ledoyen and Sir William Burnett in particular, I should feel much obliged by your insertion of the formula I have adopted for the former preparation, as many inquiries have been made for it both in town and country:—

℞ Carbonate of lead (dry white lead) 2lb. *avoird.*
Nitric Acid (commercial) ..... 20 oz. *avoird.*
Water q. s. to make up one gallon imperial.

Put the lead into a large basin or pan, mix the acid with twice its bulk of water, pour it on the lead and stir them well with a stick: when effervescence has ceased add the remainder of the water. After standing a short time it will become perfectly bright. Care should be taken to have the lead in excess, and a little more must be added, if necessary, to ensure the full saturation of the acid employed.

This solution contains about forty ounces of the nitrate of lead in the gallon, whilst Ledoyen's does not contain more than

twenty. My object was to prepare as concentrated a solution as possible (the materials being so cheap) so that it could be diluted at pleasure. I have directed one part of this solution to be mixed with two parts of water for sprinkling about rooms, &c.; and a pint to a pail of water for disinfecting drains, &c.

I think the assertions of Brande, Fownes, and others must be somewhat in error, that nitrate of lead requires from seven to eight parts of water to dissolve it. My experiments with the crystallized salt also negative this conclusion.

Although the publication of the Parliamentary Report has elicited a variety of opinions as to the efficacy of this preparation, some of them even stripping it of all claims to public attention, I still think that it possesses some very good points which should, and no doubt will eventually, recommend it to general use, although its good qualities have undoubtedly been much exaggerated by its introducers. It certainly is a valuable *disinfectant* (in the majority of those cases in which a disinfecting liquid is required by the public), but its powers as an *antiseptic* have yet to be proved. There is one purpose to which it is undoubtedly applicable; and should it in the end prove of no other utility it will still be regarded as a boon to the medical profession: I allude to its use in dissections, &c. It was only yesterday two medical men called to thank me for some I had sent them, which they had used in a *post-mortem* examination of a very disagreeable character (the patient had died of obstinate constipation). They purposely allowed some of the fœcal matter to dry on their hands, and on washing them with the fluid, it quite removed the disgusting odour. It has also this advantage, that it does not corrode the scalpels and other instruments as chloride of lime was wont. I am, dear Sir, yours truly,

JOHN FORDRED.

Church Street, Hackney, September 22d, 1847.

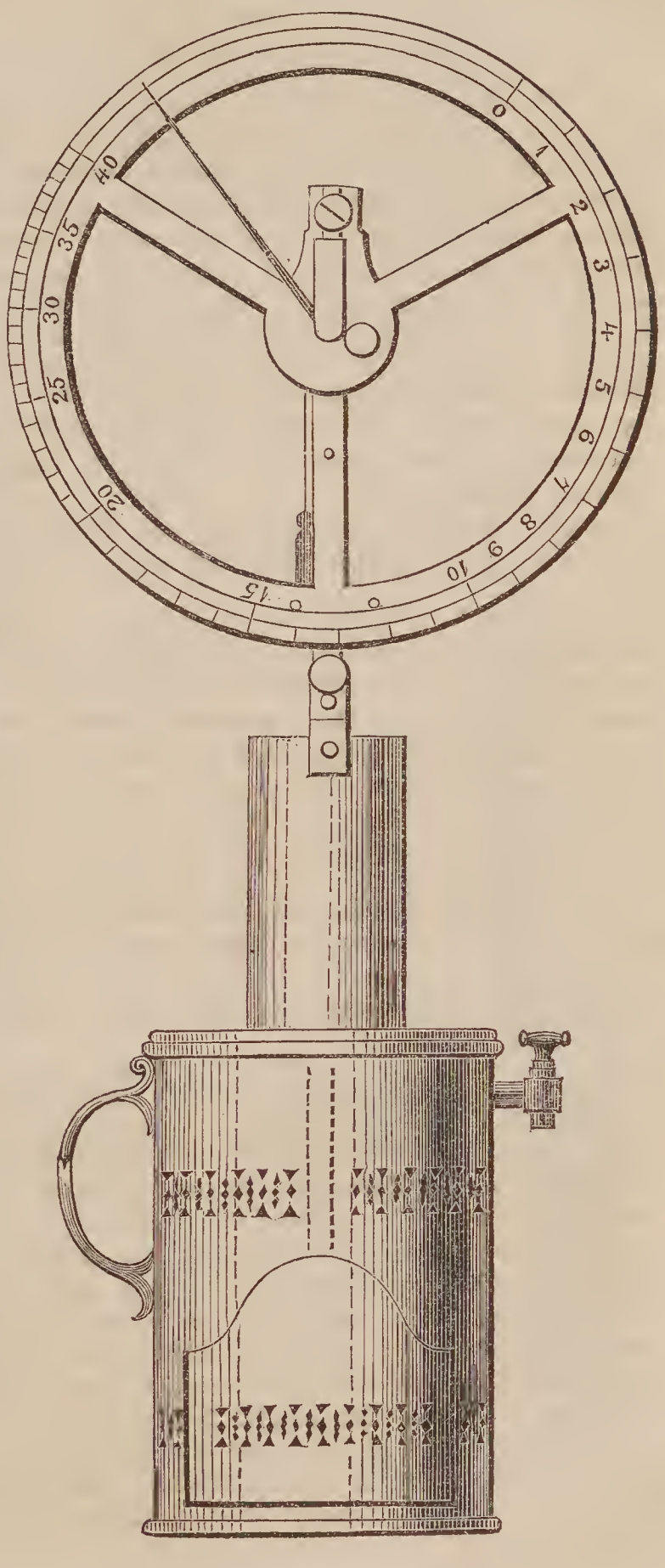
ON THE EBULLITION ALCOHOLMETER.

BY ANDREW URE, M.D., F.R.S., &c.

THAT the boiling temperature of water is increased by holding neutro-saline and saccharine substances in solution has been long known, and has been the subject of many experiments, made partly with the view of ascertaining from that temperature the proportion of the salt or sugar, and partly with the view of obtaining a practical liquid bath. But it seems to have been reserved for the Abbé Brossard-Vidal, of Toulon, to have discovered that the boiling temperature of alcoholic liquors is, in most cases, proportional to the quantity of alcohol, irrespectively of the quantity of neutro-saline or saccharine matter dissolved in them. When, however, such a quantity of dry carbonate of potash, or sugar, is added to a spirituous liquor as to abstract or fix in the solid state a portion of the water present, then

the boiling temperature of that mixture will be lowered in proportion to the concentration of the alcohol, instead of being raised, as would be the case with water so mixed. But, generally speaking, it may be assumed as a fact, that the boiling point of an alcoholic liquor is not altered by a moderate addition of saline, saccharine, or extractive matter. On this principle, M. Brossard-Vidal constructed the instrument represented in fig. 1, for determining by that temperature the proportion of alcohol present. His chief object was to furnish the Revenue Boards of France with a means of estimating directly the proportion of alcohol in wines, so as to detect the too common practice of introducing brandy into their cities and towns under the mask of wine, and thereby committing a fraud upon the *octroi;* as the duty on spirits is much higher than on wines.

Fig. 1.



The above instrument consists of a spirit-lamp, surmounted by a small boiler, into which a large cylindric glass bulb is plunged, having an upright stem of such calibre, that the quicksilver contained in them, may, by its expansion and ascent when heated, raise before it a little glass float in the stem,

which is connected by a thread with a similar glass bead, that hangs in the air. The thread passes round a pulley, which turning with the motion of the beads, causes the index to move along the graduated circular scale. The numbers on this scale represent per centages of absolute alcohol, so that the number opposite to which the index stops, when the liquor in the cylinder over the lamp boils briskly, denotes the percentage of alcohol in it.

That instrument was placed in my hands several months ago by Mr. Field, who had obtained a patent in this country for determining thereby the strength of spirituous liquors. I made a great many experiments on the boiling points of alcohol at various successive degrees of watery dilution, and verified the general utility of the contrivance, but I found the construction of the instrument subject to several defects. The mass of mercury to be heated in the large bulb was so great as to occasion some loss of alcohol in the course of the experiment; the length of the thread was liable to be affected by the moisture of the air, it occasionally failed to move the pulley with sufficient delicacy on account of friction, and when the spirit in the lamp got heated in its case, it flared up and burned the thread, thus rendering the apparatus useless till a fresh thread was experimentally adjusted to the beads.

On these accounts I renounced the construction of M. Vidal, and adopted the more simple and direct form of indication represented in fig. 2.

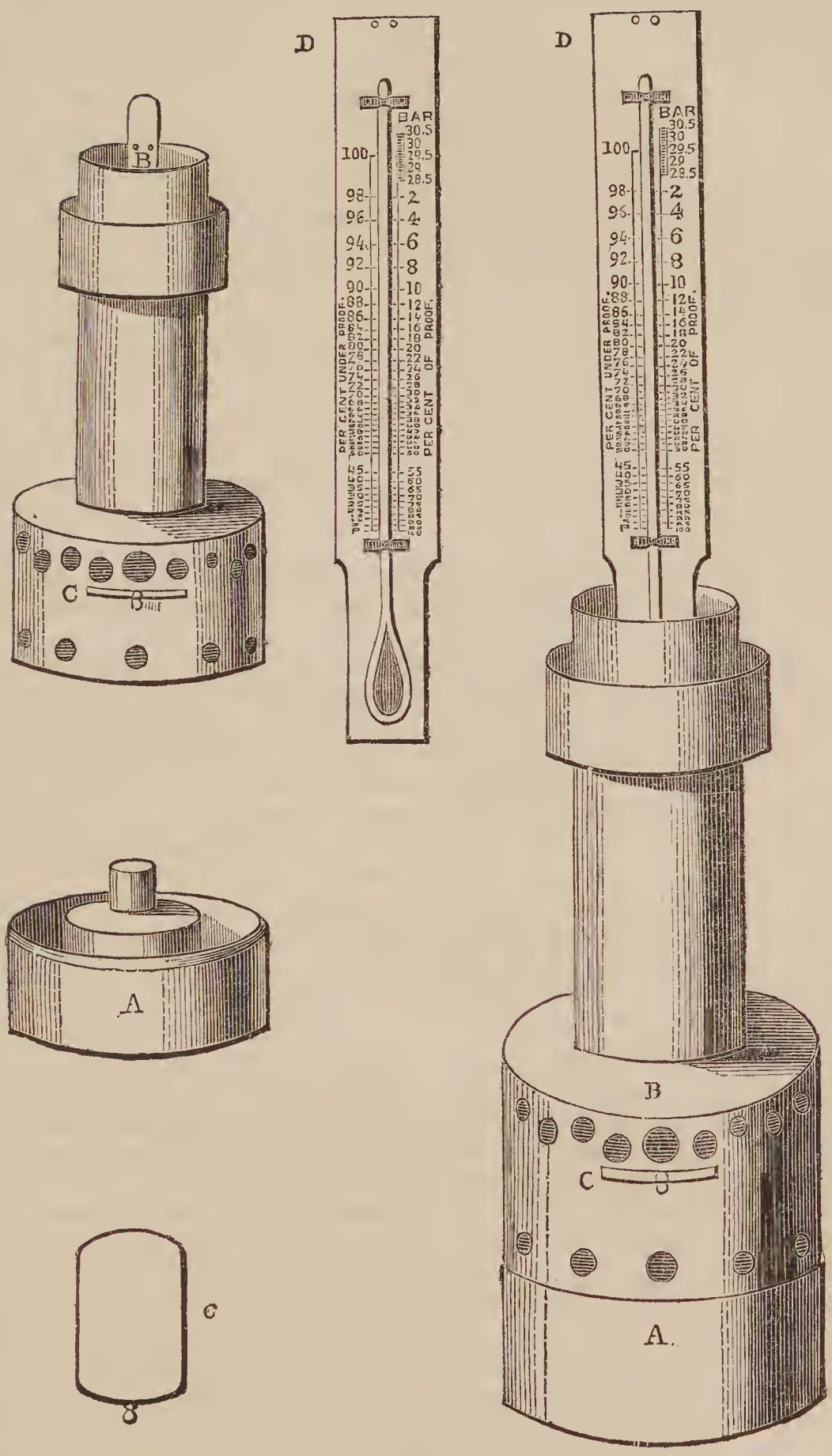
It consists, 1, of a flat spirit-lamp *A*, surrounded by a saucer for containing cold water to keep the lamp cool, should many experiments require to be made in succession; 2, of the boiler *B*, which fits by its bottom cage *C*, upon the case of the lamp. At the point *C*, is seen the edge of the damper-plate for modifying the flame of the lamp, or extinguishing it when the experiment is completed. *D* is the thermometer, made with a very minute bore, in the manner of the Rev. Mr. Wollaston's instrument for measuring the height of a mountain by the boiling point of water on its summit. The bottom of the scale in the ebullition thermometer, is marked *P* for proof on the left side, and 100 (of proof spirit) on the right side. It corresponds to 178.6 Fahr. very nearly, or the boiling point of alcohol of 0.920, specific gravity. The following table gives the boiling points corresponding to the indicated densities:—

Temp. Fahr.	Specific gravity.	Temp. Fahr.	Specific gravity.
178.6	0.9200...P.	185.6	0.9665...50 U. P.
179.75	0.9321...10 U. P.	189.0	0.9729...60 "
180.4	0.9420...20 "	191.80	0.9786...70 "
182.00	0.9516...30 "	196.4	0.9850...80 "
183.40	0.960 ...40 "	202.0	0.992 ...90 "

The above table is the mean of a great many experiments. When alcohol is stronger than 0.92, or the excise-proof, its boiling point varies too little with its progressive increase of strength, to render that test applicable in practice. In fact, even for proof spirits, or spirits approaching in strength to proof, a more exact indication may be obtained by diluting them with their own bulk of water, before ascertaining their strength, and then doubling it.

The boiling point of any alcoholic liquor is apt to rise if the heat be long-continued, and thereby to lead into error in using this instru-

FIG. 2.


D
BAR
30.5
30
29.5
29
28.5
100
98
96
94
92
90
88
86
84
82
80
78
76
74
72
70
2
4
6
8
10
12
14
16
18
20
22
24
26
28
55
PER CENT UNDER PROOF.
PER CENT OF PROOF.
B
C
A
G

ment. This source of fallacy may be in a great measure avoided by adding to the liquor in the little boiler about a teaspoonful (thirty-five grains) of common culinary salt, which has the curious effect of arresting the mercury in the thermometer at the true boiling point of the spirit, wine, or beer, to enable a correct reading to be had. The small measure marked *M*, holds the requisite quantity of salt.

The thermometer is at first adjusted to an atmosphoric pressure of 29.5 inches. When that pressure is higher or lower, both water and alcohol boil at a somewhat higher or lower temperature. In order to correct the error which would hence arise in the indications of this instrument under different states of the weather, a barometrical equation is attached by means of the subsidiary scale *E*, to the thermometer *D*.

Having stated the principles and the construction of the ebullition alcoholmeter, I shall now describe the mode of its application.

First.—Light the spirit lamp *A*.

Second.—Charge the boiling vessel *B*, with the liquid to be tested (to within an inch of the top), introducing at the same time a paper of the powder; then place the vessel *B* (the damper plate being withdrawn) on to the lamp *A*.

Third.—Fix the thermometer *D* on the stem attached to *B*, with its bulb immersed in the liquid. The process will then be in operation.

The barometrical scale indicated on the thermometer, is opposite the mean boiling point of water. Prior to commencing operations for the day charge the boiler *B* with water only, and fix the instrument as directed; when the water boils freely the mercury will become stationary in the stem of the thermometer, opposite to the true barometrical indication at the time. Should the mercury stand at the line 29.5, this will be the height of the barometer, and no correction will be required; but should it stand at any other line, above or below, then the various boiling points will bear reference to that boiling point.

In testing spirituous or fermented liquors of any kind, when the mercury begins to rise out of the bulb of the thermometer into the stem, push the damper-plate halfway in its grove to moderate the heat of the flame. When the liquor boils freely, the mercury will become stationary in the stem; and opposite to its indication, on the left, the under-proof per centage of spirit may be read off at once, if the barometer stand that day at 29.5 inches; while on the right-hand scale, the per centage of proof spirit is shown; being the difference of the former number from 100. The damper-plate is to be immediately pushed home to extinguish the flame.

The alcoholmeter will by itself only indicate the per centage of alcohol contained in any wine, but by the aid of the hydrometer, the proportionate quantity of saccharum in all wines may be readily and easily determined. The hydrometer will show the specific gravity of the liquid upon reference to table No. 1, annexed. In testing a sample of wine, first take the specific gravity, and suppose it to be 989, then charge the boiler of the alcoholmeter with the wine, as directed, and at the boiling-point it indicates the presence of alcohol at 69.6 per cent. ^{up}, whose specific gravity will be found to be 979; deduct that gravity from the gravity of the bulk, or 989, and 10 will remain, which 10 degrees of gravity, upon reference to the wine table, will be

found to represent 25 lbs. of saccharine or extractive matter in every 100 gallons, combined with $30\frac{4}{10}$th gallons of proof spirit.

Sikes's hydrometer will only shew the specific gravity of liquids lighter than water (or 1000) and for wines in general use, their gravities being lighter than that article, will answer every purpose; but there are wines whose gravities are heavier than water, such as mountain, tent, rich Malagas, lachrymæ Christii, &c, to embrace which additional weights to the hydrometer will be required, as for cordialized spirits, &c. In testing a sample of rich mountain, its S.G. was found to be 1039, or 39 degrees heavier than water, that wine at the boiling-point indicated the alcohol at 72.5 per cent.^{up}; but 980 S.G. deducted from 1039 leaves 59 degrees of S.G.; against 59 of the wine tables will be found 147-5 or $147\frac{1}{2}$lbs. of saccharine or extractive matter combined with $27\frac{1}{2}$ gallons of proof spirit to every 100 gallons.

Should the barometer for the day show any other indication above or below the standard of 29.5, the thermometer scale will then only show the apparent strength, and reference must be had to the small ivory indicator, *E*, it being the counterpart of the barometrical scale of the thermometer, thus—should the barometer indicate 30, place 30 of the indicator against the boiling point of the liquid, and opposite the line of 29.5 will be found the true strength.

Example 1.—Barometer at 30.—Suppose the mercury to stop at the boiling-point 72^{up}, place 30 of the indicator against 72 on the thermometer, and the line of 29.5 will cut 69.6^{up}, the true strength.

Example 2.—Barometer at 29.—Suppose the mercury to stop at the same point, 72^{up}, place 29 of the indicator against 72 on the thermometer, and the line of 29.5 will cut 74.3^{up}, the true strength.

FOR MALTED LIQUORS.

To all brewers and dealers in fermented liquors, this principle, by its application, will supply a great desideratum, as it will not only show the alcohol created in the wort by the attenuation, as well as the original weight of the wort prior to fermentation, but it will indicate the value of malt liquors in relation to their component parts. It will likewise be a ready means of testing the relative value of worts from sugar compared with grain, as well as being a guide to the condition of stock beers and ales.

To ascertain the strength of malt liquors and their respective values, the instrument has been supplied with a glass saccharometer, testing-glass, and slide rule. Commence by charging the testing-glass with the liquid, then insert the saccharometer, to ascertain its present gravity or density per barrel, and at whatever number it floats that will indicate the number of pounds per barrel heavier than water.

Example 1.—Suppose the saccharometer to float at the figure 8, that would indicate 8lbs. per barrel; then submit the liquid to the boiling test, with the salt as before directed, and suppose it should show (the barometrical differences being accounted for) 90^{up}, that would be equivalent to 10 per cent. of proof alcohol. Refer to the slide rule, and place *A* on the slide against 10 on the upper line of figures, and facing *B* on the lower line will be 18, thus showing that 18lbs. per barrel have been decomposed to constitute that per centage of spirit; then, by adding the 18lbs. to the present 8lbs. per barrel, the result will be 26lbs., the original weight of the wort after leaving the copper.

Example 2.—The saccharometer marks 10lbs. per barrel, and at the boiling point it indicates 88^{-up}, equivalent to 12 gallons of proof spirit per cent; place *A* against 12, and opposite *B* will be 21½ lbs. per barrel, when, by adding that to the 10lbs. present, 31½ lbs. will be the result.

TO ASCERTAIN THE RELATIVE VALUE.

Suppose the price of the 26lbs. beer to be 36*s*. per barrel, and the 31½ lbs. beer to be 40*s*. per barrel, to ascertain which beer will be the cheapest, place 26 on the opposite side of the rule against 36, and opposite 31½ lbs. will be 43*s*. 7*d*., showing that the latter beer is the cheapest by 3*s*. 7*d*. per barrel.

By taking an account of the malt liquors by this instrument prior to stocking, it may be ascertained at any time whether any alteration has taken place in their condition, either by an increase of spirit by after fermentation and consequent loss of saccharum, or whether, by an apparent loss of both, acetous fermentation has not been going on towards the ultimate loss of the whole.

This instrument will likewise truly indicate the quantity of spirit per cent. created in distillers' worts, whether in process of fermentation or ready for the still, the only difference will be in the allowances on the slide-rule

N.B.—The saccharometers applicable to the foregoing rules for beers, ales, &c, have been adjusted at the temperature 60, Fahrenheit, and will be found correct for general purposes, but where extreme minuteness is required, the variation of temperature must be taken into account, therefore for every 10 degrees of temperature above 60, 3-10ths of a pound must be added to the gross amount found by the slide-rule; on the contrary, for every 10 degrees below 60, 3-10ths of a pound must be deducted.

FOR CORDIALIZED SPIRITS.

The operation in this instance is somewhat different from that of beers, which have the alcohol created in the original worts; whereas, in cordialized spirits, gins, &c., the alcohol is the original, and the saccharine matter, or sugar, is an addendum.

If 100 gallons of spirit are required at a given strength, say 50 per cent. under proof, 50 gallons of proof spirit, with the addition of 50 gallons of water, would effect that object, and upon testing it by the alcoholmeter, it would be found as correct as by the hydrometer. But in cordializing spirits it is different, for to the 50 gallons of proof spirit 50 gallons of sugar and water would be added, thereby rendering the hydrometer useless, except for taking the specific gravity of the bulk, and, according to the quantity of sugar present, so a relative quantity of water must have been displaced; and as the sugar has no reducing properties, the alcoholmeter will only show the strength of the cordial in relation to the water contained in it, as the principle indicates, irrespectively of saccharine or extractive matter present.

Suppose, in making 100 gallons of cordial at 50 ^{up}, 3lbs. of sugar are put to the gallon, or 300lbs. to the 100 gallons, that 300lbs., displacing 18$\frac{67}{100}$th gallons of water, only 31$\frac{33}{100}$th gallons of water instead of 50 have been applied; the sugar, without reducing properties,

making up the bulk of 100 gallons, which is meant to represent 50 per cent. ^{up}.

The alcoholmeter will only show at the full point of ebullition the alcoholic strength in relation to the water in the 100 gallons of the mixture, or 35 per cent. ^{up}, leaving 15 per cent. to be accounted for on the bulk.

As the quantity of sugar present must be determined before that per centage can be arrived at, a double object will be effected by so doing, namely, eliciting in all instances the quantity of sugar present, as well as the per centage of spirit to be accounted for.

Example 1.—In taking the S.G. of a cordial, suppose it to be found 1076, then submit the liquid to the boiling point, and having ascertained the per centage of alcohol, and it proves to be 35-^{up}, the S.G. of alcohol at that strength will be found to be 956; deduct 956 from the S.G. of the bulk, or 1076, and 120 will remain; refer that to its amount on the head line of table No. 2, namely 120, under which will be found 3, representing 3lbs. of sugar to the gallon; and by running the eye down its column to opposite the alcoholic strength indicated (35-^{up}) will be found 14.9, which represents the per centage of water displaced by the sugar, and which amount of 14.9, added to the 35 per cent. ascertained, makes the total upon the bulk 49.9 per cent. ^{up}, with 3lbs. of sugar to the gallon.

FOR GINS, &c.

Example 3.—In taking the S.G., suppose it be found 957; then submit to the boiling point, and it proves to be 14-^{up}, whose S.G. is 937, which deducted from 957, leaves S.G. 20; on the head-line of table No. 2, under 20, will be found $\frac{1}{2}$, or $\frac{1}{2}$lb. of sugar to the gallon, and on running the eye down to opposite 14-^{up}, will be found 3.0, which added to the 14, makes the total on the bulk 17 per cent. ^{up}, with 50lbs. of sugar to the 100 gallons.

To Chemists for their tinctures, &c., this instrument will be found essentially useful.

N.B.—Care must be taken that the mercury is entirely in the bulb of the thermometer before it is fixed on the stem for operation, and in all cases (except for water) the salt must be used.

CONCLUSION.

Wines are peculiarly subject to be mystified by adulterations of various kinds. It will prove of great advantage to the public when the relative quantity of fruit, or *saccharum*, and alcohol requisite to constitute the normal wine of each species is well ascertained.

Some beers possess a remarkable narcotic power, by which they cause drowsiness and stupor without corresponding previous exhilaration. Such beverages may justly be suspected of having been sophisticated with *cocculus indicus*, opium, or some analogous drug; and this suspicion may become certainty, if they be shown by the alcoholmeter to contain only a few per cents. of fermented spirit.

No. 1.

TABLE OF SPECIFIC GRAVITIES, by Sikes's Hydrometer, adapted to Field's Patent Alcoholmeter for Cordialized Spirits.

TEMPERATURE 60°. SPECIFIC GRAVITY OF WATER 1000°.

60		70		80		90		100		110		120		130		140		150		160		170		180	
Wt.	S G	Wt	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G	Wt.	S G
60	922	70	942	80	961	90	981	100	1000	110	1020	120	1041	130	1063	140	1085	150	1107	160	1129	170	1152	180	1175
1	924	1	943	1	963	1	983	1	1002	1	1022	1	1044	1	1065	1	1087	1	1109	1	1131	1	1155	1	1178
2	926	2	945	2	965	2	985	2	1004	2	1024	2	1046	2	1067	2	1089	2	1111	2	1134	2	1157	2	1180
3	928	3	947	3	967	3	987	3	1006	3	1026	3	1048	3	1069	3	1091	3	1113	3	1136	3	1159	3	1182
4	930	4	949	4	969	4	989	4	1008	4	1029	4	1050	4	1071	4	1093	4	1116	4	1139	4	1162	4	1185
5	932	5	951	5	971	5	991	5	1010	5	1031	5	1052	5	1074	5	1096	5	1118	5	1141	5	1164	5	1187
6	934	6	953	6	973	6	993	6	1012	6	1033	6	1054	6	1076	6	1098	6	1120	6	1143	6	1166	6	1189
7	936	7	955	7	975	7	995	7	1014	7	1035	7	1056	7	1078	7	1100	7	1123	7	1145	7	1168	7	1191
8	938	8	957	8	977	8	997	8	1016	8	1037	8	1058	8	1080	8	1102	8	1125	8	1148	8	1171	8	1194
9	940	9	959	9	979	9	999	9	1018	9	1039	9	1061	9	1082	9	1104	9	1127	9	1150	9	1173	9	1196
10	942	10	961	10	981	10	1000	10	1020	10	1041	10	1063	10	8085	10	1107	10	1129	10	1152	10	1175	10	1199

The foregoing Table, which shows the Specific Gravity on the bulk of the mixture, bear reference to the Table (No. 2) of the Alcoholmeter following.

No. 2.

TABLE, showing the lbs. of Sugar per Gallon in Cordialized Spirits, with the Per Centages to be added to the indicated Strength, per the Alcoholmeter.

Difference of Gravity. lbs. of Sugar per Gallon.		10 4 oz. or 25 to 100	15 6 oz. 37½ to 100	20 8 oz. 50 to 100	25 10 oz 62½ to 100	30 12 oz. 75 to 100	35 14 oz. 87½ to 100	40 1.0	45 oz. 1.2	50 oz. 1.4	Difference of Gravity. lbs. of Sugar per Gallon.	
Sp. Grav. of Spirit.	Per Cent. of Spirit.										Per Cent. of Spirit.	Sp. Grav. of Spirit.
920	Pf.	1.6	2.5	3.4	4.4	5.3	6.2	7.1	8.1	9.0	Pf.	920
923	2.5	1.6	2.5	3.3	4.3	5.2	6.1	6.9	7.8	8.8	2.5	923
926	5.	1.5	2.4	3.2	4.2	5.0	5.9	6.8	7.7	8.6	5.	926
929	7.5	1.5	2.3	3.2	4.1	4.9	5.8	6.6	7.5	8.4	7.5	929
932	10.	1.4	2.2	3.1	4.0	4.8	5.7	6.5	7.4	8.2	10.	932
935	12.5	1.4	2.2	3.1	3.9	4.7	5.5	6.3	7.2	8.0	12.5	935
938	15.	1.4	2.1	3.0	3.8	4.6	5.4	6.2	7.0	7.8	15.	938
940	17.5	1.3	2.1	2.9	3.7	4.5	5.3	6.0	6.8	7.6	17.5	940
943	20.	1.3	2.0	2.8	3.6	4.4	5.2	5.9	6.7	7.5	20.	943
945	22.5	1.3	2.0	2.7	3.5	4.3	5.0	5.7	6.5	7.3	22.5	945
948	25.	1.2	1.9	2.6	3.4	4.1	4.8	5.5	6.3	7.0	25.	948
950	27.5	1.2	1.9	2.5	3.3	4.0	4.7	5.3	6.1	6.8	27.5	950
952	30.	1.1	1.8	2.4	3.1	3.8	4.5	5.1	5.8	6.5	30.	952
954	32.5	1.1	1.7	2.3	3.0	3.6	4.3	4.8	5.5	6.2	32.5	954
956	35.	1.0	1.6	2.2	2.9	3.5	4.1	4.6	5.3	6.0	35.	956
958	37.5	1.0	1.6	2.1	2.8	3.4	3.9	4.4	5.1	5.8	37.5	958
960	40.	.9	1.5	2.0	2.7	3.2	3.8	4.3	4.9	5.5	40.	960
962	42.5	.9	1.5	2.0	2.6	3.1	3.6	4.1	4.7	5.3	42.5	962
964	45.	.9	1.4	1.9	2.5	3.0	3.5	4.0	4.6	5.1	45.	964
965	47.5	.8	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9	47.5	965
967	50.	.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8	50.	967
969	52.5	.7	1.2	1.7	2.2	2.6	3.1	3.6	4.1	4.5	52.5	969
970	55.	.7	1.2	1.6	2.0	2.4	2.9	3.4	3.8	4.2	55.	970
972	57.5	.6	1.1	1.5	1.9	2.2	2.7	3.1	3.5	3.9	57.5	972
973	60.	.6	1.0	1.4	1.8	2.1	2.5	2.9	3.3	3.6	60.	973
974	62.5	.6	1.0	1.3	1.7	2.0	2.4	2.7	3.1	3.4	62.5	974
976	65.	.5	.9	1.2	1.5	1.8	2.2	2.5	2.8	3.1	65.	976
977	67.5	.5	.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9	67.5	977
979	70.	.4	.7	1.0	1.3	1.5	1.8	2.1	2.4	2.6	70.	979
980	72.5	.4	.7	.9	1.1	1.3	1.6	1.9	2.1	2.3	72.5	980
982	75.	.3	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0	75.	982
983	77.5	.3	.5	.7	.9	1.0	1.2	1.4	1.6	1.8	77.5	983
984	80.	.2	.4	.6	.8	.9	1.0	1.2	1.4	1.6	80.	984
986	82.5	.2	.3	.5	.7	.8	.9	1.0	1.2	1.4	82.5	986
988	85.	.2	.2	.4	.6	.7	.8	.9	1.0	1.2	85.	988
990	87.5	.1	.2	.3	.5	.6	.7	.8	.9	1.0	87.5	990
992	90.	.1	.1	.2	.4	.5	.6	.7	.8	.9	90.	992
994	92.5	...	.1	.2	.3	.4	.5	.6	.7	.8	92.5	994
996	95.	...	...	.1	.2	.3	.4	.5	.6	.7	95.	996
998	97.5	...	...	...	.1	.2	.3	.4	.5	.6	97.5	998

The instrument in its complete state is made and sold by Mr. Joseph Long, Little Tower Street. The tables, of which the above is only a portion, and the barometric indicator have been constructed by him and Mr. Atlee.

24, *Bloomsbury Square, Sept.* 20*th*, 1847.

FORMULÆ FOR TINCTURE OF ACONITE.

(*See page* 153).

TINCTURA ACONITI. (*United States Pharmacopœia*).

Aconite (dried leaves) ℥iv.
Diluted alcohol (proof spirit) f ℥xxxij.
Macerate for foutreen days, express, and filter through paper.
(It may also be prepared by percolation.)

TINCTURA ACONITI. (*Paris Codex*).

Dried leaves of Aconite, ℥iv. Alcohol, 1lb. or { Fresh leaves, 1lb. Alcohol, 1lb.
Macerate for fifteen days, express, and filter.

TINCTURA ACONITI. (*Pharmacopœia borussica*).

Fresh leaves of Aconite, one part.
Alcohol, eight parts.
Bruise and macerate for twelve days, express and filter.

TINCTURA ACONITI. (ETHEREA. *Pharm. borussica*).

Powder of Aconite leaves, one part.
Rectified Sulphuric Ether, eight parts.
Macerate for several days and filter.

TINCTURA ACONITI. (*Dr. Pereira's Mat. Med*).

Root of Aconite recently dried and coarsely powdered, lbj.
Rectified Spirit, Oiss.
Macerate for fourteen days and strain.

TINCTURA ACONITI. (RADICIS CONCENTRATA, *Dr. Turnbull*.)

Powdered Aconite root, 1lb.
Rectified Spirit, 2lb.
Digest for seven days, express, and filter.

TINCTURA ACONITI. (EXTRACTI, *Liston*.)

Alcoholic Extract of Aconite, ℥ss.
Alcohol, ℥iss. Dissolve.

To prepare the
ALCOHOLIC EXTRACT OF ACONITE.

Macerate lbj of the bruised root in two pints of rectified spirit for a fortnight. Express, distil, and evaporate to a proper consistence.

THE NEW DUBLIN PHARMACOPŒIA.

BY MR. DONOVAN.

THE publication of a new edition of the Dublin Pharmacopœia affords an opportunity for improvement, which, of course, will be made available by the introduction of such remedial agents as have been discovered since the former edition was published, twenty years since.

But if additions be deemed expedient, I hope retrenchments will be considered as no less deserving of consideration. The Pharmacopœia is burdened with an enormous quantity of useless materials and processes which it would be important to withdraw. So numerous a catalogue of Materia

Medica can neither convenience the Physician nor benefit the public, and is an oppresive burden on the Apothecary, who is liable to be called on for every article contained in it, or described in the department of processes. In the catalogue of Materia Medica there are nearly one hundred articles that are never prescribed, and which on that account may be deemed useless, or at least superfluous. Many of them have no connexion with the province of the Apothecary, as carrots, thyme, marjoram, onions, garlic, oatmeal, wheat-flour, allspice, pepper, long pepper, and some other articles, no doubt very useful in the kitchen ; along with a few fruits, as mulberries, figs, raisins, buckthorn-berries, elder-berries, hips, cassia fistula. We have some miscellaneous matters, as sponge, soft-soap, barilla, potash, pearlash, hartshorn-shavings, which have more relation to domestic economy than to medicine. We could also probably dispense with sorrel, marshmallow, peach-leaves, wormwood, two kinds of mugwort, two kinds of southernwood, fern-root, scurvy-grass, wild-lettuce, loosestrife, horehound, balm, buckbean, herb-bennett, elecampane, Indian-pink, crowfoot, spearwort, pinus balsamea, poison-oak, rue, rumex aquaticus, bladderwrack, bistort, tansy, tussilago, verbascum thapsus, clove-pink, violets, sweet-bay, red poppy. The seeds of angelica, coriander, wild-carrot, and stavesacre, are no longer used. We no longer require the winter's-bark, cassia-bark, cabbage-bark, simarouba-bark, or willow-bark. Some of the old resinous bodies can well be dispensed with, as Canada balsam, opoponax, sagapenum, Chio turpentine, storax, petroleum. We have a few dye-stuffs, the use of which in medicine is not very obvious, as madder, litmus, dyer's-bark, turmeric, and cochineal. If tragacanth were left to the clear-starcher, lignum vitæ to the ship block-maker, and cowitch to the trickster, the Physician would be nothing the worse, and the Apothecary so far the better.

It is really a hardship that the Apothecary should be expected to allow such medical trumpery a place in his repository. The space occupied, the cost of containing vessels and their ornamental labels, with the expense of the articles themselves, and of their replacement, when, after remaining with him unsought and useless for years, he is obliged to throw them away, are so many sources of inconvenience, loss, and unnecessary infliction, which claim a remedy.

But although all these things are supposed to be in the Apothecary's store, there are many of them which he cannot procure ; and there are several of the herbs which if used at all should be in the green state—perhaps it is winter—how then is the prescription of a Physician who overlooks this fact to be supplied ?—Amongst the processes, there are more than one hundred which are either redundant or inconvenient. Falling under one or other of these characters are the processes for acetate of soda, acetate of iron, tincture of acetate of iron with alcohol, tincture of acetate of zinc, acetate of mercury ; black, red, and what is called sulphuric oxide of mercury ; black and red sulphurets of mercury ; mercury with magnesia ; black and red oxides of iron. Among the alkalies, we can dispense with simple spirit of ammonia, fœtid spirit of ammonia, potassa cum calce, and sal sodæ. Among the acids, we may safely omit purified sulphuric acid. Amongst the salts, purified nitre, purified Epsom salt, and precipitated phosphate of lime will be no loss. The process for carbonate of magnesia is of no use, as the Chemist will not employ it, and the Apothecary does not prepare the article. The following distilled spirits may well be omitted :—Spirits of aniseed, caraway, cinnamon, mint, peppermint, pennyroyal, pimento, and even lavender, as the Apothecary will always prefer the essential oil to anything he can draw from the herb. The oils of pimento, rue, savine, sassafras and amber, are now out of use ; and the same may be almost said of oil of juniper. As to the extracts, it would be of

little injury if, with very few exceptions, they were expunged ; what can be the use of burthening the Pharmacopœia or the Apothecary with processes for extracts of oak-bark, wormwood, liquorice, rue, sarsaparilla, broom-tops, tansy, or of dandelion, which last is spoiled in the preparation: or of opium, which cannot be proved to possess one advantage ; or of gentian, which is chiefly used to give a bad body to pills ; or of simple colocynth, where there is a compound extract which alone is used ?

The list of ointments would bear extensive retrenchment without injury; the following might be expunged :—Ointments of nitric acid, of sulphuric acid, of yellow wax (that of white wax suffices), of hemlock, of acetate of lead, of elder, of hellebore, and the weak mercurial ointment.

Amongst the tinctures, we could well spare those of cinnamon, hemlock, galbanum, black hellebore, musk, cubebs ; there are two tinctures of acetate of iron, neither of which succeeds in the preparation ; and three tinctures of aloes, not one of which is in use.

There are two processes for carbonates of potash with unmanageably long names, and one for a very bad soda water which nobody would drink.

Of aqueous preparations there is an immense assortment, few of which are of any use : would the Pharmacopœia suffer if the following were expunged :—Decoctions of taraxacum, of hellebore, of chamomile, of guaiacum, of barley ; infusions of horse-radish, simarouba, flax-seed : there are two decoctions of sarsaparilla differing in no material respect, and creating much confusion ; there are also two infusions of mint similarly circumstanced.

It would be conferring a benefit on the profession, including prescribers and compounders, if the whole tribe of distilled waters were expunged. There is no use in giving an instruction to an Apothecary with which he will never comply. Distilled waters are much more conveniently made by mixing the essential oils, dissolved in spirit, with water : they are invariably prepared so, and succeed fully as well as if distillation from the herb or the oil had been employed. The change would also have the effect of introducing uniformity of strength in Apothecaries' shops ; at present every operator pleases his own fancy. In place of the distilled spirits, it would also be an improvement to substitute alcoholic solutions of the essential oils in determinate proportions. Of the confections little can be said in praise ; conserve of roses, of rue, confection of almonds, and of opium, may very well be omitted.

The syrups are the plague of apothecaries; their fermentation, mothering, crystallizing, deposition of shreds and skins, and the bursting of the bottles, are so many sources of annoyance which are not balanced by any advantage ; three syrups, one for taste and two for colour, might suffice.

Considering the powders, it is only necessary to ask what is the use of the obsolete hiera piera, pulvis aloes comp., pulvis corn cerv. usti, pulvis kino comp., pulvis scam. c., pulvis spongiæ ustæ, pulvis stanni, pulvis pro cataplasmate ?—There are two compound powders of chalk leading to a dangerous confusion ; and beside this, the quantity of opium in one of them is difficult to remember, and not apportioned to all constitutions, ages, and states. What is the use of pulvis aromaticus, inasmuch as it is weaker than ginger ?

Amongst other sources of confusion and mistake should be noticed what is called liquor plumbi subacetatis, and liquor plumbi subacetatis compositus, the prescriber almost never remembers the difference of the names, and very frequently mistakes them, or uses extemporaneous names of his own contrivance, to the no small perplexity of the Apothecary. The latter liquid is useless on account of its ridiculous dilution.

We have two kinds of almond milk : a mucilage of tragacanth, which I never knew to be once prescribed ; an oxymel of colchicum, to which the

same observation may be applied : and oxymel of copper which contains no copper ; a purified honey inferior to that article in its natural state ; and honey of roses, which has a very bad colour unless made differently from what the Pharmacopœia directs.

As to the poultices, some of them may as well be left avowedly to the nursetender, who has long been really the operator ; the boiling and mashing of the carrots is rather an unseemly process in the Apothecary's shop; and as to the peculiar kind of bad bread which is made of flour and yeast, it is far too solid for a poultice.

The nomenclature calls loudly for improvement ; I do not mean by any adaptation of new discoveries in the chemical constitution of bodies, for that attempt has already done a sufficiency of mischief, but is now irremediable—we require curtailment. The little adjunct (comp.) is a great evil ; it can only be of use where there are two tinctures of one article, but can be of no service where there is but one, Yet we find it in tinct. benzoës c., tinct. card. c., tinct. gent. c., tinct rhei c., tinct. sennæ c., spiritus armoraciæ c., sp. anisi c., sp. junip. c., infusum armor c., inf. aurant c., inf. catechu c., inf. gent. c., inf. lini c., inf. sarsæ c., inf. sennæ c., and in many other cases. We also find simple and compound preparations of trivial articles ; the consequence being that a prescriber cannot recollect when he is to write the comp. and when not ; hence arises an uncertainty on the part of the Apothecary as to what is meant, he being aware that his character for accuracy is in the hands of the Physician.

Some of the names are of a monstrous length, such as carbonas potassæ e lixivo cinere ; carbonas potassæ e tartari crystallis ; extractum hœmatoxyli campechiani. Why need the genus and species be specified in extractum glycyrrhizæ glabræ, extractum humuli lupuli, and some others, when no confusion can arise by using one name only?

In the new Pharmacopœia, it is to be hoped that the inf. sennæ cum tamarindis, a medicine often required for immediate use, will not be directed to infuse for four hours, to the great annoyance of the patient, and the risk of the Apothecary's reputation for dispatch, and perhaps an infusion of bark not requiring twenty-four hours can also be devised. It is to be hoped that the notorious citrine ointment will be deprived of its protean changes, and that the transitory tincture of kino will be rendered permanent. The measures no doubt will be identified with the imperial standard, and it is a great pity that the weights oppose some difficulty to a similar arrangement.

In case that omissions are to be made in the new catalogue of Materia Medica and officinal compounds, it will be of little use unless a formal notification of them be given in the *English* preface of the Pharmacopœia. If this be not done, practitioners will overlook the change, and prescribe from the old list of redundancies.—*Dublin Medical Press.*

BOTANICAL CHARACTERS OF A NEW PLANT
(*Isonandra Gutta*)
YIELDING THE GUTTA PERCHA OF COMMERCE.

BY SIR WILLIAM JACKSON HOOKER.

In the *London Journal of Botany*, for January, 1847 (see *Pharmaceutical Journal*, vol. vi. p. 377—381) is some account of the uses to which the gum yielded by the Gutta Percha plant has been applied ; and we trust

ere long to offer further particulars on that subject.* Our design now is to give the plant itself a station and a name; for Gutta Percha, like many other valuable vegetable products that could be mentioned, is afforded by a tree hitherto unknown to naturalists. At the time the former paper was written we had, as there stated, only seen immature fruit, from which and the habit of the plant we were disposed to refer it, though not without a mark of doubt, to "*Bassia?*" We wrote, however, to Dr. Oxley, at Singapore, a gentleman ardently devoted to natural history pursuits, for some flowering specimens; and by return of post he, in the most obliging manner, and for which we here tender him our hearty thanks, sent well preserved specimens, protected by a thin box, of which the top and bottom were made of sheets of the gum itself (now deposited in the Museum of the Royal Gardens of Kew). These flowering specimens have given us a more accurate knowledge of the structure of the inflorescence, and we feel little hesitation in referring this plant to Dr. Wright's new genus of *Sapotaceæ*, which he has called *Isonandra*, and of which he has published two species (both in our herbarium) natives of the Madras Peninsula; to which De Candolle has added the *Sideroxylon Wightianum*, Wall. Cat. n. 4154 (non Hook.), and the *S. Perrottetiana* from the Nielgherries. Our plant quite accords in habit with *Isonandra*, and seems to differ only in the number of divisions and parts of the flower: *tetramerous* in Dr. Wight's species, *haxamerous* in our plant. We propose to call the Gutta Percha Plant

ISONANDRA GUTTA;

Foliss longe petiolatis obovato-oblongis coriaceis integerrimis acuminulatis subtus aureo-nitentibus parallelo-venosis basi attenuatis, floribus axillaribus fasciculatis, pedunculis unifloris, calycis lobis imbricatis obtusis, corollæ subrotatæ lobis 6 ovatis patentibus, staminibus 12.

HAB. Mountains of Singapore, *Mr. Thomas Lobb*, (n. 290), *Dr. Oxley*.—The same species is said to be found in Borneo (on the authority of *James Brooke, Esq.*), and in other Malay islands.

Arbor 40-pedalis, lactiflua, ramis junioribus subrufo-pubescentibus, teretibus. Folia alterna, subcoriacea, obovata, integerrima, brevi-acuminata, basi in petiolum longum gracilem attenuata, pennivenia (venis arctis, parallelis, horizontali-patentibus), supra viridia, subtus aureo-nitentia. Flores axillares, fasciculati, subnutantes, pedunculati. Pedunculi perbreves, uniflori. Calyx subovato-campanulatus, profunde 6-fidus, lobis biserialibus ovatis, obtusis, subaureo-nitentibus. Corolla subrotata; tubo brevi vix calycem superante; limbo 6-partito, lobis ovatis seu ellipticis, obtusis, patentibus. Stamina 12 ad faucem corollæ inserta, uniserialia. Filamenta æqualia, filiformia, lobis corollæ longiora. Antheræ ovatæ, acutæ, extrorsæ. Ovarium globosum, subpubescens, 6-loculare, loculis omnibus uniovulatis (?): stylus longitudine staminum filiformis. Stigma obtusum. Fructus calyce persistente suffultus; bacca dura, ovato-subglobosa, 6-locularis, loculis 4 fultus; bacca dura, ovato-subglobosa, 6-locularis, loculis 4 abortientibus obsoletis, 2-fetilibus monospermis. Semina, vix matura, ad angulum interiorem loculi inserta.

Fig. 1. Flower, scarcely expanded; *f.* 2. ditto, with the corolla expanded; *f.* 3. pistil; *f.* 4. transverse, *f.* 5. vertical section of the ovary; *f.* 6. anther; *f.* 7. scarcely mature fruit, *nat. size; f.* 8. transverse section of ditto,—all but *f.* 7. *magnified.*

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* Messrs Wilkinson and Jewksbury, 138, Leadenhall Street, have employed it, among other purposes, most successfully for casts of coins and medals.

ISONANDRA GUTTA.

PATENT INKS, AND NEW SALTS OF GOLD.

PATENTEE, REV. J. B. READE, OF STONE VICARAGE, AYLESBURY.

BLUE WRITING INK.

1st. I manufacture, in manner following, a blue writing ink, which is wholly free from acid, and therefore well adapted for use with steel pens. I first obtain a solution of iodide of iron by the process ordinarily followed for that purpose, and then dissolve therein half the weight of iodine already employed. I next pour this mixture into a semi-saturated solution of yellow prussiate of potash, employing a weight of this salt nearly equal to the whole weight of iodine used in the above iodine solution. A decomposition of the materials thus brought together immediately takes place, when the cyanogen (of the prussiate of potash) and iron combine, and are precipitated in a solid form, and the potassium (of the prussiate) and iodine combine to form a neutral iodide of potassium, which remains in solution with a little excess of iodide of iron. I next filter and wash the solid precipitate of cyanogen and iron (which is soluble Prussian blue), and finally dissolve it in water, which forms the blue ink required. In this process, it will be observed that neither any acid nor persalt of iron is employed, as is usual in the formation of Prussian blue.

I was led to these results by a microscopical examination of the metallic colours in salts of the ashes of plants. I employed iron and iodine to produce the same effects on pure salts; and in the course of my experiments I ascertained that these two substances (iron and iodine) have so great an affinity for each other, that when placed together without any water, or when rubbed together, they very speedily form a liquid, containing an excess of iodine in solution, which, being added to a solution of prussiate of potash, gives the compound of cyanogen and iron, or soluble Prussian blue, which has been just described. The addition of water alters the character of this iodine solution; without water it turns litmus paper green, and with water, it has the usual acid re-action, thus apparently confirming Davy's original doubt as to the elementary character of iodine.

2nd. I form a neutral *iodide of potassium*, of great purity, and wholly free from alkaline re-action, in manner following:—I take the solution which remained over from the process first described, after the Prussian blue had been precipitated, which solution consisted, as before stated, of a neutral iodide of potassium, with iodide of iron in excess; and I get rid of that excess by the well-known processes of fusion and crystallization. The result is an iodide of potassium, which is as pure as when iodine and potassium are made to act directly on one another, and is perfectly free from the alkaline re-action on turmeric paper, which invariably characterizes the most careful preparations of this salt when carbonate of potassa is employed (as usual) in its manufacture. It is also much less deliquescent than the ordinary iodide of potassium of commerce, , and on account of its great purity, much to be preferred in medicinal preparations.

BLUE PRINTING INK, No. 1.

3rd. I manufacture a blue ink of peculiar intensity, and, therefore, particularly suitable for printing purposes, by using the same materials, and manipulating them in the same way as first described, with the exception that for the iodine wherever it is used, I substitute bromine, and rub up the precipitate in oil.

4th. I form a *bromide of potassium* of great purity, and wholly free from alkaline re-action, by treating the bromide of potassium, which remains over in a state of solution from the process last before described, in the same way as the iodide of potassium solution is directed to be used under the second head of this specification.

BLACK WRITING INK.

5th. I manufacture a very superior black writing ink, by adding to gall ink of a good quality soluble Prussian blue, described under the first head of this specification. The addition of this Prussian blue makes the ink, which was already proof against alkalies, equally proof against acids, and forms a writing fluid which cannot be erased from paper by any common method of fraudulent obliteration without the destruction of the paper.

RED WRITING INK.

6th. I manufacture, in manner following, a red writing ink, which is greatly superior to the common solutions from peach-wood and Brazil-wood, not only in permanent brilliancy of colour, but also in its freedom from acid, and consequent fitness for use with steel pens. I first boil cochineal repeatedly in successive quantities of pure water, till it ceases, or nearly so, to give out any colouring matter. I then boil it in water containing liquor ammoniæ, which combines after the manner of an alkali with an acid, with the residue of colouring matter, and leaves the insect matter nearly white. The liquid products of these successive boilings are then thrown together into an earthenware vessel, and in order to get rid of a peculiar element or principle still combined with the colouring matter, and which has a great affinity for iron, I precipitate the colouring matter with ammonio-bichloride of tin. The precipitate is afterwards dissolved in ammonia, and protiodide of tin added, till a sufficient degree of brilliancy of colour is obtained, which completes the process, water being added *ad libitum,* according to the degree of body desired to be given to the ink.

MARKING INK, No. 1.

7th. I manufacture by the improved process following a marking ink, which may be used with steel pens, and is not only of great intensity of colour, but comes out most readily on the application of heat. I rub together in a mortar nitrate of silver, and the proper equivalent of tartaric acid in a dry state. I then add water, on which crystals of tartrate of silver are formed and the nitric acid set free. I next neutralize this acid by adding liquor ammoniæ, which also dissolves the tartrate of silver. I finally add gum, colouring matter, and water, in the usual way, and in quantities which may be varied at pleasure. By this process the nitric acid, which is essential to a good marking ink, is retained, and the tartrate of silver formed is soluble in less than half the quantity of liquor ammoniæ ordinarily required when tartrate of silver is the basis of the ink. The tedious operation of filtering and washing the carbonate of silver, in order to form the tartrate, is also thereby entirely dispensed with.

MARKING INK, No. 2.

8th. I manufacture, in manner following, a marking ink, differing from the preceding, and all other marking inks containing salts of silver only, in this respect, that it cannot be acted upon by the common solvents of salts of silver, as cyanide of potassium or chloride of lime, and is so far, therefore, more indelible. I take the ink, as it has been formed by the process last described, and add to it an ammoniacal solution of an oxide, or salt of gold. I have used for this purpose, the purple of Cassius, the hydrosulphite of gold, the ammonio-iodide of gold, and the ammonio-periodide of gold. The two last salts, which I believe to be new salts, I obtain by dissolving iodine in liquor ammoniæ under the application of heat; an operation, however, which requires to be conducted with great caution, in order to prevent the formation of the explosive compound, the teriodide of nitrogen. This iodine solution is a very speedy solvent of gold. If gold leaf be placed upon it without the addition of water, a black oxide of gold is formed, which immediately dissolves, but if it be diluted with water, the process of oxidation is less rapid, and the gold leaf assumes a fine purple colour (not black) before solution. This salt of gold crystallizes in four-sided prisms, which

are soluble in water. A few drops of this solution placed on a slip of glass, generally form microscopic arborescent crystals, from which, under the application of heat, both the iodine and ammonia may be volatilized, and arborescent metallic gold alone remains. If a moderate heat only is employed, one equivalent only of iodine is dispelled, and white crystals of ammonio-iodide of gold remain.

BLUE PRINTING INK, No. 2.

9th. I manufacture a blue printing ink by taking the soluble precipitate of cyanogen and iron, obtained by the process described under the first head of this specification, and rubbing up the same in oil, after the manner ordinarily followed in the manufacture of printing inks; or by boiling down the blue writing ink produced by the said process, to a sufficient consistence, and then rubbing up the same in oil.

BLACK PRINTING INK, No. 1.

10th. I manufacture a black printing ink by boiling down the black writing ink produced from the materials, and by the process described under the fifth head of this specification, and rubbing it up in oil as aforesaid.

RED PRINTING INK.

11th. I manufacture a red printing ink by taking the ammoniacal solution of cochineal, obtained by the process described under the sixth head of this specification, and rubbing it up in oil, adding protiodide of tin according to the degree of lustre required; or by boiling down the red writing ink, produced by the said process, to a sufficient consistence, and then rubbing up the same in oil as aforesaid.

BLACK PRINTING INK, No. 2.

And, 12th, I manufacture a black printing ink by boiling chips of logwood (for which an extract of logwood may be substituted), or other dye woods containing colouring matter and tannin, along with as much of a protosalt or persalt of iron, or copper, or other precipitate of tannin, as will be equal to about twice the weight of the tannin contained in the wood or extract employed; whereby I obtain a black or blueish black precipitate, the blueness of which I diminish, as may be required, by the addition of bichromate of potash, more or less. I finally rub up the whole in oil as aforesaid, adding a small quantity of the lampblack or other black colouring matter, ordinarily employed in the manufacture of black printing inks.—*Mechanics' Magazine.*

ON THE OCCURRENCE AND GEOGRAPHICAL DISTRIBUTION OF THE GENUINE CINCHONA (*CINCHONA CONDAMINEA*),

AND OF OTHER CINCHONA SPECIES IN THE NEIGHBOURHOOD OF LOXA.

BY DR. VON MARTIUS.

(*Continued from page* 91).

The pressure of the atmosphere, which is higher than the weight of a column of quicksilver of 23″, and lower than that of one of 20″, the same as a temperature which does not fall between 4° and 18° R. are unfavourable, and even hostile, to the vegetation of cinchona. The zone in which it grows is consequently 566.5 toises (1132.08 varas, Castellan) wide. This peculiarity, together with the nature of its soil, is confined both towards the west and the east. If the Cordillera be intersected from west towards east in the latitude of Vilcabamba, which Caldas has found to be 4° 18′ 30″ south latitude, and which place occupies the centre of the cinchona land, the proper section of this land is obtained; and if a similar section be continued from Tumbez on the Pacific ocean to Pará on the Atlantic, it will be found that from Tumbez, towards the east, low hills continue to rise, but do not reach with their tops the lower terminus of the cinchona of 813.5 toises, or 1898.5 varas, Castellan. At 615.6

toises (1436.4 varas, Castellan) is Zaruma with its mines. From here mountains rise above the hills, which exceed the lower terminus, and almost reach the upper one at 1380 toises (3230 varas, Castellan). This is the celebrated mountain of Urito-Singa. This mountain-chain is situate westward of Loxa, and extends from Malacatos to Cysne and Sant-Iago to about eight to nine ship-leagues (20 to 1 degree). Opposite, and exactly westward of the city of Loxa, it forms a craggy ridge, and at the highest top a point, which resembles the beak of a parrot, hence the name Urito-parrot and Singa-nose or beak. These mountains have yielded, for more than a century, large quantities of bark, without being exhausted; it has also, as is well known, given the name *Cascarilla de Urito-Singa* to the best sort of bark. From here the land sinks in the profile-line towards the city of Loxa, which, as has been stated, is situate at an elevation of 1002.7 toises (=2339.6 varas, Castellan). Now, it rises again towards Caxanuma, and sinks till towards Malacatos, Cararango, and Vilcabamba. Caxanuma is a branch of the Urito-Singa, which runs towards the Cordillera of Zamora. This mountain-chain forms the water separation between the Rio de Zamora and the Rio Catamaio, of which the first falls in the Atlantic and the latter in the Pacific ocean. On the Caxamuna, the barometer keeps at 252″.5, which gives for this mountain a height of 1172.7 toises (2736 varas, Castellan, and 170 toises, 396.6 varas, Castellan) above Loxa. Here, the same as on the Urito-Singa, the finest cinchona is found.

From Vilcabamba the profile rises without interruption to 1400 to 1500 toises, and forms the Cordillera of Zamora, which separates the Maranon from Catamaio or Colan. From this point the mountains sink towards Zamora and Tomependa on the Amazon river. At the latter spot, which, according to Humboldt, lies at an elevation of 168 toises, or 392 varas, Castellan, the extensive plains begin, which gradually sloping down descend to the coast of the Brazils, near Pará, on the Atlantic ocean.

From these observations it is to be inferred, that in the enormous extent which South America offers between the 4 to 5° south latitude, only the Cordillera of Zamora and Urito-Singa reach the lower terminus of the *Cinchona Condaminea*, and it is not likely that this plant will be found to the west or east of these mentioned places. The eastern terminus falls accordingly in 1° 45′, and the western in 0° 35′ westward of the meridian of Quito, and we obtain the following boundaries for *Cinchona Condaminea*:—

Southern terminus	4° 40′ south latitude.
Northern terminus	3° 42′ south latitude.
Difference	0° 58′
Eastern terminus.....	0° 35′ westward of Quito.
Western terminus	1° 45′ westward of Quito.
Difference	1° 10′

Lower terminus 813.5 toises above the level of the sea.
Upper terminus 1380.0 toises above the level of the sea.

Difference	566.5 toises.
Half of the difference	283.2 toises.
+	813.5 toises.
Height of the average line of the Cinchona-zone	1096.7 toises.

Temperature of the upper terminus (minimum) ...	4° R.
" " lower terminus (maximum) ...	18° R.
Difference	14° R.
Sum	22° R.
Average temperature ...	11° R.

From these data the number of square leagues may be calculated, on which the best cinchona grows. This district is bounded in the north by the Rio de las Juntas, which takes its origin in the mountains of Zaraguru to the mouth of the small river Rio de Sant-Jago, which rises from the mountains of Cysne. Then the river of this name forms to its fall into the Catamaio the boundary, which runs now along this river to its junction with the Macara, in 4° 20′ south latitude, and 1° 50′ westward of Quito.

Towards the south the land is bounded by the Rio de Macara, the mountains of Aya-Baca, Valladolid, to the junction with the Cordillera de Zamora, which bounds the district towards the east. The surface of this district may be supposed to be 275 sea miles, reckoning 20 to one degree. If 100 miles be subtracted for the valleys, which are situate below the inferior terminus, there remains 175 square miles as favourable to the growth of the Cinchona Condaminea. Since, however, the extent of surface is much increased by the many mountains, we may add twenty-five leagues, so that we obtain a sum total of 200 leagues.

In his memoir of 1803, Caldas observes, further, that it is strange there has not been made, during the 167 years that this tree has been known, any attempt on a large scale to multiply the same by artificial transplantation. There is no doubt that many parts of the forests, which are not beyond the twelfth degree of latitude, and where the barometer keeps between 241 and 277″, and which are consequently situate between 813 and 1380 toises above the level of the sea, would prove well adapted for the cultivation of the cinchona tree. He mentions at the same time a number of those places in Peru, which correspond to the above-mentioned conditions; amongst which are Quito, Yntac, Cuenca, Paute, Popayan, Santa-Fe, &c. Popayan appears to him to be most appropriate for this purpose : the temperature there being 10 to 17° R., the pressure of air 275″.2, the elevation above the level of the sea 901 toises, or 2102 varas, Castellan ; also the quality of the soil and the vegetation of many plants agree with those of the neighbourhood of Loxa. Caldas tried to import thither ten young cinchona trees, which were, however, damaged by the carelessness of the Indian who carried them. Attempts to introduce the cinchona tree into Europe will not be successful, according to Caldas's opinion, as it is impossible to procure for it so low a pressure of air as 23″, simultaneously with the suitable, mild, and uniform temperature, together with the fogs, which prevail in its native country during nine months. He objects, therefore, very strongly to the proposal of Ruiz (*Chinologia*, p. 21) to introduce this tree into Biscaia, Galicia, Catalonia, or Andalusia, where the pressure of air is 27″, and the temperature from + 28° to 30° in summer, and—5° or 0° in winter. At the period when Caldas wrote, no attempt had as yet been made for this purpose on a large scale. As a reason why this cannot be done, the inhabitants adduce, that the tree only thrives in the shade and standing amongst other large trees. This is, however, not the case, according to the observations which Xavier Valdivieso, formerly Corregidor of Loxa, has made. Four young cinchona trees, which he had transplanted into the chapter-court of Loxa, throve very well, and would have been preserved had not, after the death of this gentleman, horses been admitted into the yard, which destroyed the trees. Of the 200 square leagues on which the cinchona tree grows, there were at the time when Caldas wrote, only 16 to 20 in the neighbourhood of Malacatos, Vilcabamba and Gonsanamá exhausted, the remaining were as yet untouched. He is of the opinion that some official laws regarding the abuses practised by the collectors (*cascarilleros*) would suffice to secure the quantity required every year both for the royal court apothecary as also that for commerce. The worst abuse which these bark-gatherers are guilty of, is that they never spare the seed, but cut down the tree and peel it, just as it happens to be in their way. This is the reason why

there is often in a circle of several miles, neither blossom nor seed to be found. All trees which Caldas found (1805) in the exhausted districts, were (*Renuevos*) only 2—4 at most 6 years old, which yielded however, already bark. He recommends therefore, to spare trees for seed, and to superintend them by proper officers. Many gatherers (*acopiadores*) peel the trunk and break off the branches in the most cruel manner, the consequence of which is, that the tree dries up and decays. Others fell the tree straight from the root. This also very improper manner, is, however, not quite so prejudicial as the other, for the remaining stump produces generally 2, 3, sometimes even 5 shoots, and it is only owing to this circumstance, that cinchona trees are yet found in the pillaged parts. Also the ground fires, which the agriculturists light in August and September on the declivities of the mountains, in order to renew the pasture, and which often extend to the adjoining forests, are very destructive to these trees.

Thus the gathering of the bark becomes every year more difficult, and the cascarilleros are compelled to penetrate many miles into the forests in order to collect the 2—4 arrobas, which they must deliver to the corregidor. One cinchona tree of thirty to forty years of age, yields three to four arrobas * of bark; one shoot of five to six years of age, only twelve to fourteen pounds. In order to collect the 500 arrobas † which were yearly gathered for the crown and sent to Spain, 1000 full-grown trees are required, and these can only yield bark again, after five to six years. To supply this want, 6000 plants must be preserved in the same condition, and for the purpose of being able to transmit yearly 500 arrobas, at least 10,000 trees must be preserved in a proper state. The expenditure for felling and peeling the cinchona trees, contained, according to Caldas in 1805, the following items:—

The Corregidor of Loxa, as chief-superintendent of the cinchona business, 500 Spanish dollars.

A Professor of botany and chemistry, for conducting the special affairs, 1000 Sp. dollars. (If obliged to travel, he received 2000 dollars). This office was last filled by D. Vicente Olmedo.

A store-keeper, 200 Sp. dollars.

A comptroller (*Guarda môr*) in Malacatos, 100 Sp. dollars.

Fifty labourers (*cascarilleros*) who lived in Malacatos, Vilcabamba, and Gonzanamá, and worked by contract.

In the month of June, the corregidor appointed to every one, according to his bodily strength, activity, and experience, a certain number of arrobas, which they had to deliver in the month of December. Each cascarillero received an advance in proportion to the number of arrobas he had to gather, and for each of which he received twenty reals.

The collectors provided themselves with dried meat and other provisions, and commenced, in the month of August, their pilgrimage into the forests. In December, they brought the crop to Loxa, where it was packed in boxes, and sent in January to the government officer in Piura, who shipped it to Callao. A hundred-weight of this royal bark cost the Spanish treasury till its arrival in Piura, 33.4 piasters, as the following items show:—

Salaries for the officers	1800 piasters
Expenses on 500 arrobas in Loxa	1250 "
Boxes, iron hoops, &c.	625 "
Freight.....	500 "
	4175 piasters

Also $\therefore \frac{4175}{500} = 8.35 \times = 33.4$ piasters.

Extracts from the bark have not been made by Olmedo, and Caldas complains in general that this gentleman has done but very little for the natural

* Three-quarters to one cwt. † 125 cwt.

history of the cinchona-tree whilst in office. We do not yet know with certainty the period when it is in bloom, whether this is once or twice a year—when the leaves open—whether this takes place gradually, like in all equatorial plants, or at once—when the fruit is ripe—how much time is required for the seed to germinate—whether the tree grows from layers or slips—at what period it contains the greatest quantity of juice—whether the bark possesses at that period a diminished or increased effect—whether the tree, which grows near the lower terminus, is better than that near the upper terminus—whether the quality improves or diminishes in proportion to the elevation of the locality where the tree grows—how the tree is artificially to be treated—what locality suits it best—whether the quality is improved by cultivation, &c. ?* Caldas supposes that the tree is regularly twice a year in bloom, viz., in July and August, and again in December. It does not throw off the leaves at once, but gradually, and supplies them immediately; it is, therefore, evergreen. A full-grown tree is forty feet high, and its trunk is from one to two feet in diameter. If cut down, the new shoots grow somewhat obliquely, bent towards the horizon.

As regards the other sorts of cinchona, Caldas himself found seventeen, of which he gave in his memoir more or less explicit descriptions and drawings; but he has neither classified them, nor even decidedly determined their specific character. Besides these, he describes also two sorts, which were sent to him from the neighbourhood of Popayan. Although this number does not agree with that which De Candolle enumerates (*Prodromus* iv., p. 352 to 355), it is still very likely that several of them, and especially those sorts from Loxa, differ from those which have already been admitted into the system. Considered under a geographic and pharmacognostic point of view, it will not be uninteresting to add here the most essential points.

1. *Colorada de Zaraguru.*—This sort corresponds with the genuine *Cinchona Condaminea*, as regards the glands on the inferior surface of the leaves. The leaves are almost circular, obtuse, and proportionately small (2″ long and 1½″ broad) without glands; the flower is somewhat larger and the fruit elliptic. It grows in the forests of Zaraguru, on the heights of Ramosurcu, to the north of Loxa, in 3° 53′ south latitude, at a considerable elevation (1388 toises), where the barometer shows 234″ (19-20 inch), and in temperature of 10° R., only 165 toises below the upper cinchona terminus. It is much valued in commerce and follows immediately the *cascarilla f. amarilla* and *colorada de Loxa*. Before a royal order had raised the Cinchona of Loxa to a crown property, it was sold by many inhabitants with great advantage. It is very abundant on the whole Cordillera and in all the surrounding parts of Onna and Zaraguru.

2. *Colorada de Alausi* grows in Pinnanpungo (*Puerto brava*) in the mountains westward of Alausi, in 2° 10′ south latitude, under a pressure of air of 293.″1 and in a temperature of from 15°-16° R. This bark also was, in 1790, sold with great advantage. The leaves have no glands; the flower is of the same size as that of *Cinchona Condaminea*.

3. *Quina blanca de Alausi* was found near San-Nicholas, in the vicinity of the latter (barometer 232.″3), came also formerly in commerce. The leaves are without glands.

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* To the most important questions which are yet to be answered belong also the following:—At what age does the cinchona-tree attain the most perfect development of its medicinal powers? How long do they continue to last? What difference is there between the bark of the root and that of the trunk; between that of branches of five and six years old, and that of boughs of two and three years? Lastly, what is the nature of the fruit, which is also said to possess curative power, with regard to the proportion of efficacious constituents.—*Buchner.*

4. *Negra de Taday.*—From the forests near Azoguez, Paute, Gualaceo, north-east of Cuenca, in 2° 40′ south latitude; barometer 260,″ temperature 10 to 15° R., where it grows abundantly. Caldas thinks this, or one of the two following, is the *Quinquina fonceé* of Condamine. In this also, the glands are missing, as in all the following sorts, except *Crespilla negra.*

5. *Cascarilla blanca de Taday,* from the forests of Taday and Tuglin, north-east of Cuenca, in 2° 38″ south lat., blooms in September. (According to the drawings of the organs of fructification, this is not the *Cinchona macrocarpa* which has been introduced into the system under the name of *Quina blanca*).

6. *Colorada de Pan y Taday,* from the forests of Cuenca in 2° 30′ south lat. Barometer 260″ and temperature 10—15° R. It is also much valued in commerce.

7. *Hoya de Almizclillo,* is so called, because the leaf, which is ovular, elliptic, and 2″ 2‴ long, and 8½‴ broad, possesses great similarity with the leaf of an *Arbutus* (called there *Almizclillo*). It is found together with the real *Cinchona Condaminea.*

8. *Pata de Gallinazo de Loxa.*—The very little valued grey bark, frequently covered with lichens, is said to have caused this tree to be called after the vulture *Gallinazo* (*Vultur Aura L.*) because the latter constantly soils, like the condor, his feet with his excrements, by which they obtain a similar grey and unclean appearance, like the bark of this tree. The corolla is of a pink-violet colour. The tree grows near Loxa next to the genuine quina.

9. *Crespilla negra* comes also from the forests of Loxa, producing a bark without value. The leaves are glandular; the corolla is dark-violet.

10. *Hoja de Sambo* grows among the foregoing: the bark possesses no value.

11. *Ahumada,* on account of the brownish inferior surface of the leaves; it grows with the foregoing near Loxa, and its bark is without value.

12. *Pata de Gallinazo de Macuchi.*—It grows in Tagualó, near the Minas de Macuchi, westward of Latacunga, on the western slope of the Cordillera, in 0° 53′ south lat, barometer 245′.0 to 282′0; its inferior terminus, however, is not yet found. The bark is without value.

These twelve sorts are followed by some other, the names of which Caldas could not learn.

13. *Crespilla hoja de Lugma* or *Lucma.*

14. *Anonyma.*—From Berruecos, Ancuya, Guytara, under a pressure of air of 254″.1. Its leaves, which are oblong, are hirsute, chiefly on the inferior surface. The flower is similar to that of *Cinchona Condaminea.*

15. *Anonyma* from the Serro Manchique en Chiquio, a mountain westward of Popayan, in 2° 30′ north latitude; barometer from 20 to 21 inches. The efficacy of the bark against tertian fever is established (discovered by Don Geronimo de Torres y Tenorio). According to the drawing, the flower of this sort is in shape and size equal to that of *Cinchona ovalifolia,* Ruiz; the corolla is, however, externally hirsute. The capsule is cylindrical, and 25′ long and 5″ thick.

16. *Anonyma* from Horqueta, south-west of Popayan in 2° 16″ north latitude. It is related to those sorts that have been described as Ahumada and Hoja de Sambo.

17. *Requeson* is called a sort, which grows close by Popayan, and is related to the last.

18. *Anonyma* with very large, externally, not hairy, very fragrant blossoms (the corolla is 27″ long) and large (23″ long 4½″ thick) cylindrical capsules, comes from the mountains north-west of Popayan, in 2° 35′ north latitude of Torres y Tenorio.

19. *Anonyma* from Melcho, Ovejas, Pedregosa, Chroquio, &c., near Popayan in 2° 30′ north latitude. This sort, which is very abundant in

those parts, yield a very effective bark, which is easily peeled from the wood, and contains much gummy-resinous substance, *viz.*, such that is easily dissolved in water and spirit of wine.

Caldas also tries to fix the geographical boundaries of the genus *Cinchona* in general. But this part of his work is certainly very defective, considering the discoveries that have since been made in the southern parts of Peru. Only with regard to the inferior and superior terminus, it is worthy of being noticed, that Caldas places the first the same as Humboldt does, at 200 toises, whilst he places the latter, which Humboldt fixed at 1500 toises, even higher. He has, namely, observed one sort near San Nicholas, westward of Mausi, where the barometer showed 230″, which would be equal to an elevation of 1553 toises above the ocean, which point he fixes as the superior boundary of the genus, so that the breadth of the whole *cinchona zone* would be equal to 1253 toises, or 2925 varas, Castellan.

With regard to the breadth of the cinchona region between the western and eastern terminus, the same is considerably enlarged, particularly by the discovery of Dr. Von Martius, of four sorts, at the Upper Jupurá, almost at the very first beginning of the Andes, towards the east, if we exclude from the genus *Cinchona* those sorts found in Minas Geraes (*Remigia*, D. C.), a very interesting preliminary labour for a botanico-critical and geographical monograph forms the following list, drawn up by Caldas, of those places in the kingdom of Peru, where cinchona-trees grow.

In the government of Popayan: Popayan, Posojé, Hacienda. Poblacon, Pueblo. Chiribio, Hacienda. Chaupillacta, and many others. Almaguer. Quaytara. Quaytarilla. Ancuya.

In the corregimiento of Ybarra: Guaca, Pueblo, Yntac Pueblo. Quarabi, Anex, Cunchi, Hacienda.

In the environs of Quito: Nanegal. Purecho. Cansacoto.

In the corregimiento of Latacunga: Tagualó. Macuchi. Siechos.

In the corregimiento of Guaranda: Pinnanatoy. Chasojuan.

In the jurisdiction of Alausi: Calubin, Hacienda. San Nicolas, Hacienda. Pinnanpungo. Untun.

In the government of Cuenca: Cannar. Azognez. Paute. Qualaceo. Bulan. Cerro del Pan. Taday. Sidaey. Siese. San-Guxima. Mayeturo.

In the corregimiento of Loxa: The greatest part of this district is not only rich in genuine sorts, but contains also many others.

If these places are compared with those in which Thad. Haenke has found sorts of the *genus Cinchona* (*vide* the Appendix by Azara, vol. ii.) and all the new discoveries joined, it results that this genus is distributed over a considerable extent of South America. But there is no doubt that the real antifebrile sorts, the efficacy of which rests principally in the Cinchona alkaloids, which they contain, are not so abundant, and the observation made recently that a great deal of Cinchona is brought into the market, in which either none at all, or proportionately but very little alkaloid is to be discovered, appears to indicate that genuine fever bark can only be obtained from the district of the Andes-chain, and that chiefly from the upper part of its longitudinal zone. Recently large quantities of barks from Moyabamba and Minas have been introduced into commerce on the Amazon river, as *e.g.* the Quina de Pará, in which Winckler has discovered a peculiar alkaloid in small quantity.† This circumstance makes it very necessary that a strict control should be kept over those sorts which are to be admitted into the shops.‡ This is certainly very difficult in a pharmacognostic way, for although the

† Vide *Repert. f. d. Pharm.*, by Buchner, Bd. xci., p. 48 and 145. Bd. xcii. p. 29.

‡ No Apothecary ought to use bark without having first chemically examined whether it contains alkaloids.

very best sorts cannot be mistaken by an experienced apothecary, still there exists no security for the rest, where the external marks for the recognition of the quality are doubtful and deceptive. If therefore no authentic proofs for the genuineness are available, and no analysis can be instituted, there is only the higher price, at which the best sorts of bark still keep, the only guide which the Physician and Apothecary can follow in his choice.—*Buchner's Repertorium*, Bd. xlv., Heft 3.

ON THE SEPARATION OF TIN FROM ANTIMONY.

BY PROFESSOR H. ROSE.

As is well known, the separation of these two metals is accompanied with many difficulties. The older method of Claudet* recommends the use of hydrochloric acid for this purpose ; but this is attended with success only when the action of the acid upon the antimony is weakened by the presence of a very large quantity of proto-chloride of tin. By this method, as also by that subsequently proposed by Gay Lussac†, of precipitating the antimony from the solution of the two metals by means of metallic tin, the antimony alone is determined directly, and the amount of tin ascertained from the loss. Levol ‡ has, on this account, modified the process suggested by Claudet ; he dissolves the alloy of the two metals in hydrochloric acid, to which chlorate of potash has been added, precipitates both the metals from the solution by metallic zinc, and without decanting the solution of chloride of zinc, redissolves, by the addition of highly-concentrated hydrochloric acid, the tin, which is then precipitated by sulphuretted hydrogen ; while the antimony is left behind undissolved.

This method has not been found to be accurate by Elsner§, as some antimony is dissolved with the tin by the acid ; to which Levol has replied, that the presence of the chloride of zinc considerably weakens the action of the hydrochloric acid upon the antimony.

Whichever method is employed, the separation of these two metals is never so perfect as with other substances which do not behave in so analogous a manner towards reagents as tin and antimony. The method which I employ, but which to give satisfactory results must be carried out with great care, is as follows :—

Strong nitric acid is cautiously poured upon the metals, and when the violent oxidation has ceased, the whole is evaporated at a gentle heat, and the dry powder of the oxides fused in a silver crucible over an Argand lamp with an excess of hydrate of soda. The fused mass is softened with a large quantity of water, gently warmed, and the antimoniate of soda allowed to subside. When perfectly cold, the clear solution is passed through a filter ; if this is done while it is still warm, the solution will contain some antimoniate of soda. The insoluble salt is again treated once or twice with water, allowed to settle and cool, and the liquid when perfectly clear passed through the filter. When the whole of the stannate of soda has been dissolved in this manner, the liquid which has been warmed with the antimoniate of soda remains opalescent ; it must not be poured upon the filter, as it would pass through turbid. A small quantity of a dilute solution of carbonate of soda may be added to it, which renders it clear ; but the edulcoration must not be continued for any length of time, as otherwise some antimoniate would be dissolved.

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* *Ann. de Chim. et de Phys.*, iii., p. 376.
† Ibid, xlvi., p. 222.
‡ *Chem. Gaz.* vol. iii., p. 62.
§ Ibid, vol. iv., p. 105.

The moist antimoniate of soda is now treated in a beaker with a mixture of hydrochloric and tartaric acids, in which it readily dissolves ; and the filter, upon which but mere traces of the salt should have collected, washed with the same mixture. The antimony is then precipitated from the solution by sulphuretted hydrogen, and the amount of antimony estimated from the quantity of sulphuret obtained. I am at present accustomed to reduce the sulphuret of antimony by hydrogen in a porcelain crucible, through the lid of which a thin porcelain tube passes. This apparatus is now manufactured at the Royal Porcelain Works of Berlin. A gentle heat is carefully applied until the crucible no longer decreases in weight. After the reduction, the inner side of the lid is coated with metallic antimony, which might lead to the belief that the result of the experiments must be inaccurate, which however is not the case.

The solution of the stannate of soda is acidified with hydrochloric acid. It is not requisite to add so much acid that the whole of the eliminated oxide of tin is again re-dissolved. It is merely necessary that the solution should strongly redden blue litmus-paper. Upon this, sulphuretted hydrogen is passed into it. The sulphuret of tin is converted by roasting into oxide. When it has been dried, it frequently decrepitates, which, by want of care, may occasion a very considerable loss. It is on this account preferable to place it with the filter, while still moist, in a porcelain crucible, and to heat it for a long time very gently and with access of air, to expel the sulphur at the lowest possible temperature. If a strong heat be given at the commencement, white fumes of oxide escape, especially when the air has free access. The higher sulphuret of tin has the property of subliming somewhat at certain temperatures; the vapours are oxidized by contact with the air, and form oxide of tin. This is also the cause of a white sediment of oxide of tin being formed upon charcoal when sulphuret of tin is heated on charcoal before the blow-pipe. A strong heat should not be applied until there is no longer any perceptible odour of sulphurous acid. After being strongly ignited, a piece of carbonate of ammonia is placed in the crucible ; and after its volatilization, a strong heat applied with access of air, in order to expel the whole of the sulphuric acid formed. A small decrease in weight will be perceived.

The oxide of tin thus obtained never appears perfectly white ; and the sulphuret of tin precipitated by sulphuretted hydrogen does not possess a purely yellow colour, which appears to arise from melting the metallic oxides with hydrate of soda in the silver crucible, traces of oxide of silver being removed by the alkaline solution.

The results do not attain the highest degree of accuracy. Although stannate of soda containing an excess of hydrate of soda does not become turbid by boiling, as stated by Fremy, and the solution may even be evaporated until crystals separate, which entirely dissolve upon the addition of water, yet the antimoniate of soda contains a small quantity of oxide of tin. Consequently the sulphuret precipitated by sulphuretted hydrogen from the acid solution of the antimoniate of soda, contains a small amount of sulphuret of tin, which does not part with the whole of its sulphur at the temperature at which the sulphuret of antimony is reduced by hydrogen. For this reason, a somewhat smaller amount of tin, a larger quantity of antimony, and a slight excess is found in the analysis.—*Chemical Gazette*, August, 1847.

ON PLANTAIN STARCH.

BY J. SHIER, LL.D.

Dr. Shier describes the size of the corpuscles of plantain starch as ranging from $\frac{1}{400}$th to $\frac{1}{1400}$th of an inch, the general size being $\frac{1}{800}$th of an inch. The corpuscles are long and narrow, generally long elliptical, often more acute at the ends than in any other species, some linear ending abruptly ; length often three times the width.

In respect of facility of preparation, the plantain-starch, though of excellent quality, ranks lowest of all the starches obtained by Dr. Shier ; for the flesh-coloured tissue in which the starch is imbedded is somewhat denser than the starch, and settles down under it, and it is not a little difficult to arrange the process so as completely to separate the finer parts of this matter from the starch, and hence its colour is never perfectly white.

Of the yield of the plantain we possess much more accurate information than with respect to some other starch-producing plants. A new plantain-walk in this colony will yield 450 bunches, of 50 lbs. each, of which, as nearly as possible, 50 per cent. will be core, containing 17 per cent. of starch, thus producing 17 cwt. of starch per acre. But an old plantain-walk, even when free of disease, could not be reckoned to yield more than half this quantity, namely, 8½ cwt. per acre. Considering the value that is set on the plantain as an article of food, and the difficulties incident to the process of making starch from it, it is by no means probable that it will ever be used as a source from which to obtain starch.—*Report on the Starch-producing Plants of British Guiana.*

ON PLANTAIN MEAL.

BY JOHN SHIER, LL.D.

The plantain (*Musa paradisiaca*, Linn.) has frequently been suggested as an article of export. In its ripe state no unexceptionable and sufficiently cheap method of preserving it has yet been suggested. It is sometimes so abundant and cheap that it might, if cut and dried in its green state, be exported with advantage. It is in this unripe state that it is so largely used by the peasantry of this colony as an article of food. It has always been believed to be highly nutritive, but I have not found in any sample of the dried plantain which I have analysed, a larger amount than .88 per cent. of nitrogen, which corresponds with about 5½ per cent. of proteine compounds.

When dried, and reduced to the state of meal, it cannot, like wheat flour be manufactured into maccaroni or vermicelli, or at least the maccaroni made from it falls to powder when put into hot water. The fresh plantain, however, when boiled whole, forms a pretty dense firm mass of greater consistency and toughness than the potato. This mass, beaten in a mortar, constitutes the *foo-foo* of the negroes. The plantain meal cannot be got into this state unless by mixing it up with water to form a stiff dough, and then boiling it in shapes or bound in cloths.

Plantain meal is prepared by stripping off the husk of the plantain, slicing the core, and drying it in the sun. When thoroughly dry it is powdered and sifted. It is known among the creoles of the colony under the name of *Conquin-tay*. It has a fragrant odour, acquired in drying, somewhat resembling fresh hay or tea. It is largely employed as the food of infants, children, and invalids. As food for children and convalescents,

it would probably be much esteemed in Europe, and it deserves a trial on account of its fragrance, and its being exceedingly easy of digestion. In respect of nutritiveness, it deserves a preference over all the pure starches, on account of the proteine compounds it contains.

The plantain meal would probably be best and freshest were the sliced and dried plantain cores exported, leaving the grinding and sifting to be done in Europe. The flavour of the meal depends a good deal on the rapidity with which the slices are dried ; hence the operation is only fitted for dry weather, unless indeed, when there was occasion for it, recourse were had to a kiln or stove. Above all, the plantain must not be allowed to approach too closely to yellowness or ripeness, otherwise it becomes impossible to dry it. The colour of the meal is injured when steel knives are used in husking or slicing, but silver or nickel blades do not injure the colour. On the large scale, a machine, on the principle of the turnip-slicing machine, would be employed. The husking could also be greatly facilitated by a very simple machine. Were the plantain meal to come into use in England, and bear a price in any way approaching to that of Bermuda arrow-root, it would become an extensive and very profitable export. Full-sized and well-filled bunches give 60 per cent. of core to 40 of husk and top-stem, but in general it would be found that the core did not much exceed 50 per cent., and the fresh core will yield 40 per cent. of dry meal, so that from 20 to 25 per cent. of meal is obtained from the plantain ; or five pounds from an average bunch of twenty-five pounds, and an acre of plantain walk of average quality, producing during the year 450 such bunches, would yield a ton and ten pounds of meal, which, at the price of arrow-root, namely, one shilling per pound, would be a gross return of £112 10*s.* per acre. A new plantain walk would give twice as much. Even supposing the meal not to command over half the price of arrow-root, it would still form an excellent outlet for plantains whenever from any cause the price in the colony sank unusually low. Specimens have been transmitted from the Colonial Laboratory to some of the principal authorities on dietetics in England.—*Report on the Starch-producing Plants of British Guiana*, 1847.

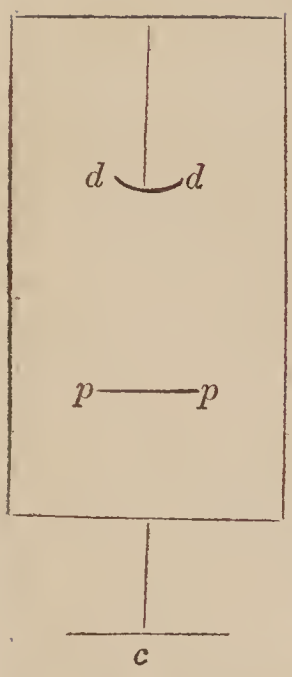
ON THE TENACITY AND CLEARNESS OF STARCH JELLIES.

BY JOHN SHIER, LL.D.

(*a*) Tenacity of Starch-Jellies.—I have met with no very precise results on this subject, except the well-known fact that it takes a much larger quantity of some starches, the arrow-root for instance, to form a jelly of equal tenacity with that formed by others, such as the *tous les mois ;* and hence in the West Indies the latter is universally preferred to the former as an article of diet ; and in like manner arrow-root, in its turn, is preferred to the cassava starches.

After trying various plans, the method which I found best fitted for comparing the tenacity of different starch-jellies was the following :—Of each of the kinds of starch twenty-four grains were weighed out and mixed with 400 grains of distilled water, in a porcelain capsule of suitable size. The mixture was then heated and boiled briskly for three minutes, with constant stirring, and was immediately poured into a conical test-glass*, which the jelly nearly filled. The time at which each glass was filled was noted, and exactly two hours were allowed for the contents to cool in a current of air. The glass was then set on a plate of glass,

* The glasses used were all of the sort described in Griffin's Catalogue under the name of Clarke's test-glasses. They were all as nearly as possible of the same size and shape.



supported on a ring of a retort stand, and the weight ascertained which was necessary to force a metallic disc, of ascertained size, through the jelly. The most convenient way of doing this was by using a piece of apparatus of the form rudely represented on the margin. The rectangular frame is of thin brass wire, and the slightly cup-shaped disc, *d d*, is soldered to a wire attached to the upper short side of the rectangle. From the opposite or lower side of the rectangle a small glass cup, *c*, is suspended, into which weights are put as soon as the disc has been made to rest on the surface of the jelly. *p p*, is the plate of glass on which the test-glass is set. Whenever the disc tears the skin of the jelly, and begins to sink in it, no further addition of weights is made, and the weight of the disc, frame-work, and cup, being known, we have an estimate of the tenacity of the jelly. This process is but approximative, and some practice is necessary before the operator succeeds in getting uniform results from the same series of specimens.

The following table shows the results on such specimens as I could procure. The disc was exactly 7-10ths of an inch in diameter:

TENACITY OF STARCH JELLIES.

No.	NAMES OF SPECIMENS.	Weight, in grains, required to break the Jelly.
1	Tous les mois, C†., C. L.	2446‡
2	Tous les mois, Grenada, Commercial	1742
3	Maize, C., C. L.	955
4	Barbados Yam, C., C. L.	895
5	Irish Potato, from Belfast, C. L.	756
6	Tannia, C., C. L.	630
7	Bermuda Arrow-root, finest Commercial	627
8	Common Yam, C., C. L.	617
9	Guinea Yam, C., C. L.	571
10	Plantain, C., C. L.	467
11	Potato Starch, Commercial	467
12	Arrow-root, C., C. L.	393
13	Sweet Potato, C., C. L.	368
14	Arrow-root, C., C. L.	340
15	Arrow-root, C.	301
16	Arrow-root, St. Vincent's, Commercial	289
17	Barbados Arrow-root, Commercial	273
18	Wheat Starch, Commercial	183
19	Buck-Yam, C., C. L.	151
20	Bitter Cassava, C., C. L.	150
21	Sweet Cassava, C., C. L.	78

† The initial C. indicates that the plant was grown in the colony; C. L. that the starch was prepared in the colonial laboratory.

‡ In this instance the weight stated detached the jelly from the sides of the glass, but the skin of the jelly was not torn, as in the other cases.

From this table it is obvious that, in respect of tenacity, there is a very great difference between the jellies prepared from the different starches—greater, indeed, than exists in regard to any other character. At first I thought it probable that the tenacity of the jelly would bear some relation to the size of the globules, and it is true that we find the Grenada tous les mois, the largest globule, next the top, and the cassavas, among the smallest at the bottom of the scale. But, on the other hand, we have the buck-yam starch, a large-sized globule, very low in the scale, and the maize-starch, a small-sized globule, very high ; together with many other exceptions.

As an article of diet, the most tenacious varieties of starch are preferred, on account of the economy of employing an article of which a less quantity will suffice ; and the same is true when applied to starching linen, provided the jelly be not deficient in clearness.

(*b*) CLEARNESS OF STARCH-JELLIES.—When starch-jelly is used for the purpose of starching or glazing linen or cotton goods, those varieties that are most transparent are understood to be preferred, provided, at the same time, they possess the requisite tenacity. This and other matters will be best determined by practical men in England ; but having had occasion many times to prepare specimens for trying the tenacity, the opportunity was always taken of arranging the specimens of jellies in the order of their clearness, or, to speak more accurately, of their translucency. In this respect also they exhibit considerable differences, varying, when prepared according to the formula described under the head of tenacity, from very translucent approaching to transparent, to milky and feebly translucent approaching to opaque. The order is shown in the following table, which begins with the clearest :—

THE ORDER OF CLEARNESS OR TRANSLUCENCY OF UNIFORMLY-PREPARED STARCH JELLIES.

Order	NAMES OF SPECIMENS.	Order	NAMES OF SPECIMENS.
1	St. Vincent Arrow-root, Coml.	12	Tannia, C., C.L.
2	Arrow-root, C., C. L.	13	Sweet Potato, C., C. L.
3	Sweet Cassava, C., C. L.	14	Common Yam, C., C. L.
4	Bitter Cassava, C., C. L.	15	Tous les mois, Grenada, Coml.
5	Bermuda Arrow-root, Coml.	16	Barbados Arrow-root, Coml.
6	Arrow-root, C., C. L.	17	Tous les mois, C., C. L.
7	Irish Potato, C. L.	18	Barbados Yam, C., C. L.
8	Potato Starch, Commercial	19	Guinea Yam, C., C. L.
9	Buck Yam, C., C. L.	20	Wheat Starch, Commercial
10	Arrow-root, C.	21	Maize, C., C. L.
11	Plantain, C., C. L.		

On comparing this table with the former one, and taking a general view of the subject, it will be seen that the jellies that are most tenacious are generally the least translucent ; and that the order of the two tables is more nearly the converse than appears in regard to any other properties. —*Report on the Starch-producing Plants of British Guiana.*

ON THE STARCH AND MEAL OF THE SWEET AND BITTER CASSAVA.

BY JOHN SHIER, LL. D.

Of Cassava Starch.—Dr. Shier mentions two sorts of cassava, namely, *Sweet Cassava* (Janipha Loeflingii, H.B.K.), and *Bitter Cassava* (Janipha Manihot, H. B. K.), as meriting attention as starch-producing plants. They are occasionally grown for this purpose in the colony of British Guiana, and yield a large percentage of starch ; but there exists an opinion, whether well or ill founded, that it is liable to rot linen, and the preference is given here to the starch of arrow-root. It remains to be seen, however, what estimate will be formed of this starch in England, for if it should prove an esteemed variety, there can be no doubt of its proving a highly profitable cultivation. Cassava grows readily in almost any soil, and, when the drainage is tolerable, two crops of the sweet variety can, it is stated, be grown in a year. I have seen it growing luxuriantly in the light soils of the interior, as well as in the stiff clay soils of the coasts. It is considered an excellent preparatory crop in new and stiff land, on account of its tendency to loosen the soil. Were the bitter variety fixed on, the preparation of *Casareep** might be combined with the preparation of starch ; and as that substance is one of the most esteemed bases for the preparation of various sauces, it is probable that this might turn out the most profitable part of the produce. At all events, bitter cassava would have this advantage over all other starch-producing roots, that the juice of the root could be turned to account as well as the starch.

Dr. Shier describes the starches of bitter and sweet cassava, consisting of corpuscles of the same size and shape. Their size varies from $\frac{1}{2000}$th to $\frac{1}{8000}$th of an inch, the general size being $\frac{1}{4000}$th. A few globules occur as large as the $\frac{1}{1000}$th of an inch : these are ovate, the others are spherical.

Of Cassava Meal.—Of the bitter cassava mention has already been made as a substance from which starch and *casareep* might be prepared. In this case, however, the woody and cellular tissue, with the small quantity of starch left in it by the ordinary starch process, would form far too poor an article of diet to constitute part of the food of man. But the roots might be used as an article from which to prepare cassava meal, *casareep*, and the very small quantity of starch which is expressed along with the juice, leaving all the rest of the starch to form part of the meal. It is of such meal that the cassava cakes of the Indians are prepared ; and, although by no means so nutritive as Indian corn-meal†, there can be little doubt that in the Scotch and Irish markets the cassava-meal would obtain a preference ; and were it exported in sufficient quantity it would probably come into extensive use among all classes.

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* To those who have never visited the tropics, it may be proper to notice that *Casareep* is the concentrated juice of the roots of bitter cassava, and the basis of the West India dish, pepper-pot. One of its most remarkable properties is its high antiseptic power, preserving any meat that may be boiled in it for a much longer period than can be done by any other culinary process. *Casareep* was originally a Buck or Indian preparation, and has often been described with more or less accuracy. For further information respecting this substance, the reader is referred to the head Cassava Meal.

† I have determined the amount of nitrogen contained in the meal made from whole maize, the growth of the colony, as also from plantain-meal. I have also ascertained its amount in cassava-meal, prepared in the manner mentioned in the text, and in meal prepared from the cassava sliced, dried,

The process would be as follows :—After washing in a revolving apparatus, by which means the adherent earth would be got quit of, and almost the whole of the thin dark-coloured cuticle would become detached, the roots would be reduced to pulp in a rasping mill without the use of water; the pulp would be compressed in bags by hydraulic pressure, whereby the juice together with a small portion of the starch would be expressed. After allowing the starch to subside, the juice would be concentrated to about the density of 1.4. The starch would be washed, purified, and dried. The contents of the bags would then be broken up and dried in the sun or in a current of air, after which the meal would be sifted through a coarse sieve to separate the coarser parts, which if their amount was considerable could be ground and added to the rest. In this state of rough meal it is fit for making the cassava cakes‡. If ground to flour it might be used to mix with wheat, rye, or barley flour.

If an acre of well tilled thorough-drained land, yields ten tons of fresh roots, and I have every reason to believe that such a return might be obtained, I have ascertained that the produce would be three and a half tons of meal, 593 lbs. of *casareep*, and two cwt. of starch ; and estimating the meal at 1*d.* per lb., the *casareep* at 1*s.* 5*d.* per lb., and the starch at 40*s.* per cwt., the gross amount would be £78 13*s.* 4*d.* per acre. In ascertaining these proportions, very simple machinery was employed, and had the pulp been better pressed the quantity of *casareep* would have been considerably greater.

From the table given in a former note it will be seen, that the cassava meal prepared in this way contains but a very small proportion of matter nutritive in the sense of contributing to the formation of blood, and that the expressed juice carries off fully one-half of the proteine compounds contained in the plant.

But cassava might be sliced, dried in the sun, and sent to Europe in that state. In this case it would be the sweet variety that would be employed. In dry weather the process succeeds remarkably well, and the dried slices keep well. I have ascertained that when these sliced and dried roots are first steeped and then boiled, they return to very nearly their original condition, and make an excellent substitute for the potato.—*Report on the Starch-producing Plants of British Guiana.*

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and ground without expressing the juice. Assuming Liebig's formula of proteine, namely, C_{48} N_6 H_{36} O_4, the results stand thus :—

	Nitrogen. Per cent.	Proteine compounds. Per cent.
Maize-meal (unhusked)	1.73	10.72
Plantain-meal	.88	5.45
Cassava meal (juice expressed)	.36	2.23
Ditto from the sliced and dried roots	.78	4.83

‡ The process is usually conducted as follows :—The squeezed pulp is broken up, sifted, and exposed to the sun on trays or mats till it is fully more than half dry. An iron hoop of the size and thickness of the cake to be made is then laid on a girdle or hot plate, and the space within the hoop is filled evenly with the somewhat moist meal, no previous kneading or rolling having been employed. As soon as the coarse meal coheres, the ring is lifted, and the cake is turned and heated on the opposite side. The heat should not be sufficient to brown the cake. The cakes are finally dried by exposure to the sun. From the dry cassava, meal-cakes may be prepared by sprinkling it with as much cold water as to moisten it to the proper point, and then proceeding as above. Hot water cannot be employed, neither can kneading, or any considerable degree of compression be used, otherwise the water does not evaporate readily enough, the starch gets too much altered by the heat, and the cake becomes tough.

ON THE ROOT AND STARCH OF THE BUCK-YAM.

(*Dioscorea Triphylla*, Linn.)

BY JOHN SHIER, LL.D.

As an edible root, the buck-yam, especially when grown in a light soil, is equal to the potato, if not superior to it. It does not, however, keep for any length of time, and, probably, could not be exported to Europe even were it grown here in sufficient quantity. Of the buck-yam meal, and of the sliced and dried roots, I have not had sufficient experience to speak.

From the yams of all sorts, and particularly the buck-yam, starch is easily prepared and of excellent quality. Some varieties of the buck-yam are purple-fleshed, often of a very deep tint approaching to black, and although this is an objection, because it renders more washing necessary, yet even from these the starch is at last obtained perfectly white.

Dr. Shier describes the starch of the buck-yam as consisting of corpuscles varying from $\frac{1}{600}$th to $\frac{1}{2000}$th of an inch, the average size being $\frac{1}{800}$th. They are elliptical, often truncated at one end, so as to be mullar-shaped, some pear-shaped, the length twice the width.—*Report on the Starch-producing Plants of British Guiana.*

POISONING BY CONFECTIONER'S ORNAMENTS.

COMMUNICATED BY MR. HETLEY,

Visiting Surgeon to the St. Marylebone Infirmary.

On Tuesday, the 14th of September, I was requested to go as quickly as I could to Marylebone Lane, as several persons had been taken suddenly and dangerously ill.

I found three adults and eight children severely affected with vomiting and retching; the angles of their mouths and linen being coloured green by the ejections.

On inquiry into the case, one of the children stated he had bought two pennyworth of some coloured confectionary ornament, of which they had all partaken. The symptoms appeared within ten minutes of its exhibition, and evidently corresponded to those produced by poisoning with verdigris or diacetate of copper. Some of the offending article (a thin cake of sugar and Paris plaster mixed, covered with a layer of bright green) was however found, which at once made the case clear.

Of vomiting there already seemed to have been quite sufficient, therefore an antidote, composed of new milk, eggs, and sugar, was liberally administered for several days, and with the best effect.

[The pigment usually employed by confectioners for green ornaments, is the arsenite of copper, a fact which has been frequently published, with a caution respecting its dangerous properties. Notwithstanding the notoriety of this circumstance, confectioners appear to be quite reckless on the subject, and sell the poison to children at so cheap a rate, that a whole family may be poisoned for two-pence! In the above case, if timely medical aid had not been at hand, eleven persons might have lost their lives in consequence.—Ed.]

TO CORRESPONDENTS.

"*Beta.*"—When sulphate of quinine and tincture of opium are mixed with infusion of roses, a precipitate will necessarily be formed, owing to the presence of tannic acid in the infusion. This precipitate ought not to be separated unless so directed by the prescriber.—(2). When bones are treated with oil of vitriol for agricultural purposes, a soluble acid phosphate of lime, and insoluble sulphate of lime, are formed.

J. Blenkhorn.—*Marine glue* is made by mixing solutions of India-rubber and shellac in coal-tar naphtha, and evaporating the mixture. It is melted by heat when used.

E. A. (*Bradford*).—(1). Battley's Liquor Opii Sedativus is generally considered to be about the same strength as laudanum.—(2). We know of no evidence to show that sulphuret of mercury and chloride of antimony are formed when Plummer's pill is taken into the stomach ; but this decomposition would occur if sufficient heat were applied.—(3). Many organic bodies, differing entirely in physical characters, have the same elementary composition.—(4). The achromatic lamp-glasses are supplied by most of the gas-fitters in London.

"*Amator Scientiæ.*"—(1). For the price and other particulars respecting *Herring's Concentrated Liquor Sarzæ*, application should be made at 40, Aldersgate Street.—(2). We cannot tell exactly when the new work on Practical Pharmacy will be out, but we believe a great part of it is printed.—(3). We know of no French work corresponding with *Gray's Supplement*, unless it be *Dorvault's Répertoire Générale de Pharmacie Pratique*, which, however, is much less comprehensive.—(4). The strength of Sir W. Burnett's solution may be determined by evaporating some of it to dryness.

M. P. S.—The edition of *Gray's Supplement*, published in 1836, was certainly not edited by S. F. Gray, for he was not then living.

"*A Country Assistant.*"—Andrew Ross, of Featherstone Buildings, Holborn, is one of the best makers of microscopes.

"*A Constant Reader.*"—Syrup of raspberries or of other fruit, for adding to ærated waters, may be made in the same way as syrup of mulberry.

C. (*Islington*), should endeavour to make arrangements for attending an entire course of lectures ; his attending once a week would be of little use, as he would necessarily miss a great part of the subject.

T. H. G. (*Northbridge*).—We have no room for a notice of the communication at present.

T. S. suggests that a list of retail prices should be issued periodically by the Pharmaceutical Society, for the guidance of the Members.—[This subject has been alluded to on a former occasion, but we believe there are some objections to it.]

"*Alpha*" should send his name and address.

M. P. S. (*Preston*), is referred to vol. vi., page 556 of this Journal, where he will see that his suggestion has been adopted.

"*Suggestion.*"—The communication has been received.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. V.—NOVEMBER 1st, 1847.

THE PHARMACEUTICAL MEETINGS.

The first of these meetings for the session will be held on Wednesday evening, the 10th of this month. Among the early proceedings of the Pharmaceutical Society, much benefit was found to result from the opportunities afforded at the Pharmaceutical Meetings, of discussing subjects alike interesting and useful to the Members of our body. It was a novelty unprecedented in this country for a large number of Chemists and Druggists to assemble, not to dispute about low prices or late hours, but to discuss, in a friendly manner, in company with members of the medical profession, a variety of Chemical and Pharmaceutical subjects, and these meetings were instrumental in establishing a sociable feeling among our Members, and giving a scientific character to the new society.

On reviewing the papers read, and the suggestions offered at these meetings, we find much valuable information of a practical character, and we are confirmed in the opinion, that a more fertile field could not be found for the advancement of the art and science of Pharmacy than periodical discussions of this description, if kept up and supported in a spirited manner.

At the present time, when a new Pharmacopœia is in course of of compilation, an opportunity exists for making a variety of suggestions, founded on the practical experience of the Chemist, in matters which do not come within the specific province of the Physician. New preparations, or improvements in those already in use—additions to the Materia Medica—modifications of chemical apparatus, as well as any other subject connected with the science of Chemistry and Pharmacy, constitute the legitimate matter for consideration at these meetings.

If it be desirable that the Chemists, as a body, should acquire their proper rank and position in a scientific profession, this advantage must be earned as the reward of merit—it can never be obtained by clamour and agitation. After the lapse of several years, during which the claims of Pharmacy have been prominently urged with reference to improved legislation, the inquiry is naturally made, what have the Chemists done, and what are they likely to do, in support of the character which they are endeavouring to assume? It is generally admitted that some advance has been made, but this is not enough: unless we persevere, we shall lose ground—it is impossible to stand still. We must

again direct attention to the example of our brethren at Bristol. A few original papers of the same character as the one by Mr. Giles, published in another part of this number, would reflect great credit on our Pharmaceutical meetings in London, and afford instruction to those Members and Associates who have not the opportunity of attending.

THE APPRENTICESHIP SYSTEM.

The system of Apprenticeship, which is of ancient date, was designed as a means of initiating persons in the art and mystery of their trades or professions, by a compact mutually beneficial to the employer and the apprentice. This compact is not a simple one, but may be considered in two points of view. In the first place, a premium is given for the instruction afforded to the youth chiefly during the early part of his apprenticeship; and secondly, as a further consideration for this advantage, the apprentice undertakes to give his services, which increase in value as the term draws to a close. The obligation of the apprentice, therefore, does not cease with the payment of the fee, which would be an inadequate compensation for the care and trouble bestowed on him during the first two or three years; he is morally and legally bound, not only to avail himself of the instruction afforded, but also to give this advantage to his employer during the whole of the term. The master is also bound to continue his instruction so long as the compact lasts; it being understood that the education of the apprentice is not completed until he has served his time, although his services, which were less than an equivalent at the beginning, are more than an equivalent at the end. But inasmuch as the total services of an apprentice are not an equivalent for the total board and instruction, the fee is intended to balance the account between the two parties.

This kind of arrangement appears in theory to be mutually beneficial; and it cannot be doubted that it is so in many cases. But the advantages of the system have been over-estimated; and the practice, prevalent in many trades and professions, of enforcing it too rigidly, has led to a variety of abuses, and impaired the value of the system itself.

The freedom of the city of London is made dependent on the serving of an apprenticeship to a freeman, and the licence of the Apothecaries' Company is granted only to those who have served an apprenticeship to an Apothecary; but it is not necessary in either case that the parties should positively comply with the spirit of the arrangement, while the letter of the law is strictly enforced; consequently, the apprenticeship is, in many cases, a mere matter of form. Although the terms of the compact are stated on the

indentures, the whole efficacy of the document lies in the signature. This remark refers especially to the city companies, which are not even confined to persons of the particular denomination or calling denoted in their respective titles.

In the case of the Apothecaries' Company the apprenticeship system is a serious evil. It is notorious that the surgery of an Apothecary is not of necessity the best school for the medical student. In some instances, it may afford every advantage that could be desired, but in others the education of the student begins when his apprenticeship ends. Yet the Society of Apothecaries positively refuse to admit a candidate to examination unless he has been apprenticed to an Apothecary. It is in vain to possess the most satisfactory testimonials, or evidence of the most elaborate education, unless he can produce the indentures of apprenticeship with an Apothecary, the Examiners are not allowed by the Act of Parliament to test his qualifications.

This impolitic regulation gives rise to a variety of artifices and evasions. It does not follow because the indentures are presented that the apprenticeship has actually been served. The student may have acquired his early education from a Chemist, or in a public institution, in this or some other country, but he has gone through the farce of an apprenticeship to an Apothecary by signing the document, and compounding a dozen prescriptions in the surgery. Indentures are occasionally ante-dated, and, in some cases, have even been borrowed or fabricated.

Those who are not provided with the regular indentures, and who object to this kind of trickery, however qualified they may be, have no alternative but to commence business as Chemists and Druggists, and practice across the counter, or they must abandon the idea of practising altogether. If it be said that young men ought to make themselves acquainted with the state of the law, in the first instance, and act accordingly, we may observe, that Scotch graduates occasionally find it desirable to change their line of practice, and become licentiates of the Hall; and some young men, who have been educated as Chemists, are desirous of going a step further and becoming medical practitioners ; and why should they be prohibited from so doing, if they acquire the requisite knowledge ? We repeat that, in the present state of the law, they are goaded into counter-practice by the Apothecaries' Company.

The evil to which we have been alluding, is the stringency with which a particular apprenticeship is enforced, in cases where it is obviously either a mere matter of form, or an unfair restriction. There is one objection to the system itself which deserves consideration. When a disagreement occurs between the master and his apprentice, or when either party fails to perform his part of the contract, the bond is not easily broken. A mutual desire

to separate may exist, and yet, year after year may be passed in discomfort, because the terms of separation cannot be settled. An apprentice may take a dislike to the business—he has ascertained that he will come into some property when he is of age, and he is resolved to be a gentleman. He defies all controul, neglects his duty, and becomes the plague of the house. His parents or guardians refuse to cancel the indentures unless the fee, or a large proportion of it, is returned. This is refused on the ground that the youth has already been more trouble than profit. The dispute continues until the master is obliged to make a sacrifice for the sake of peace and quietness, or the apprentice runs away.

On the other side, the master may neglect his part of the engagement. The apprentice finds that the situation is not what it had been represented to be—that he has but little, if any, opportunity for learning his business—that his master takes no pains to instruct him, and he is sacrificing five years of his life by continuing in the establishment. The fee has been paid, and the master refuses to return it. Legal proceedings are expensive; the parents are not in a condition to pay a second fee; and the youth is a victim to the apprenticeship system.

We think the following general rule might be observed in such cases. Supposing the term to be five years: if the disagreement occurs during the first two years, a part of the premium should be returned—if during the third year, no portion of it could fairly be claimed—if after the third year, the master is entitled to compensation for the services of his apprentice, who ought, by that time, to be as valuable as an assistant. In applying a general rule of this kind to particular cases, differing from each other in some respects, various difficulties may arise, especially when the temper of either of the parties concerned is unfavourable to mutual conciliation. Under such circumstances an arbitration is the best mode of settling the dispute. But these difficulties may be obviated altogether, by a clause in the indentures providing for a separation in the event of dissatisfaction occurring on either side, the terms and conditions being settled beforehand.

A correspondent has directed our attention to the frequency of advertisements from apprentices, who not having served their whole time, offer their services for the remaining year or two without salary. He considers this to imply a fraudulent intention on the part of the apprentice to violate his engagement. In a case where such motive could be proved, the young man would be no acquisition, for conduct is the index of character. But it sometimes happens that a master dies, or fails, and his apprentice naturally seeks another situation. In answering advertisements of this kind, strict inquiry should be made respecting the circumstances of the case.

The too frequent abuses of the apprenticeship system having

been seriously considered at the time the Pharmaceutical Society was established, the anomaly prevailing in the Society of Apothecaries was purposely avoided, and it was decided that a term of pupilage is to be taken as an equivalent to an apprenticeship of the same length.

The nature of the agreement is optional. All that is required is, that four or five years shall have been occupied in acquiring the requisite knowledge in a Pharmaceutical establishment. An arrangement determinable by either party at a month's notice, is free from the evil which constitutes the chief objection to an apprenticeship. An annual payment is better than a fee in one sum, and the sliding-scale is applicable to the case, the amount being highest during the first year, and diminishing as the pupil advances in knowledge and usefulness. In case of insubordination on one side, or negligence on the other, the aggrieved party has his remedy, and the nuisance of a "cat and dog" life during the remainder of the term is avoided.

In reference to the subject of education in our last number (page 159) we adverted to an advertisement in which the privilege of attending lectures was offered as an equivalent for half a year's salary. The advertisement being anonymous was taken simply as an illustration, without the least intention of any personal allusion.

From a letter which we have received from the author of the advertisement, it appears that we misunderstood the nature of his proposition. It appears that the proposal was intended for young men who, having had but little opportunity for improvement, are not competent to take a situation as responsible assistants, and to whom the advantage of attending lectures is of great importance, coupled with other advantages not mentioned in the advertisement, but afforded by our correspondent, who is a Member of the Pharmaceutical Society, and a staunch supporter of the School. We regret that we were not aware of these circumstances at the time, and trust this explanation will convince our Correspondent that the observation was only intended as a general one to illustrate an argument, and in ignorance of the facts contained in his letter. We understand that the advertisement was answered, and the young man who has taken the situation is perfectly satisfied.

THE BENEVOLENT FUND.

In the first code of the bye-laws of the Pharmaceutical Society, it was provided, that no appropriation of this fund should take place until the interest on the capital invested should amount to £300 per annum. If the original plan had been carried out, the fund might by this time have become available without removing the restriction: but the reduction in the subscription which was so strenuously urged upon the Council by a majority of the Members, cut off the main source from which the augmentation of the Benevolent Fund had been anticipated.

This inevitable result of the popular measure was represented by the Council at the time, but to no purpose, and the dormant state of the fund has not been favourable to its spontaneous increase by donations and subscriptions. Instead, therefore, of becoming a source of interest and a bond of union, it continues to be, up to the present time, almost a dead letter—a boon in perspective for the posterity of those on whom it depends for support.

The subject having claimed the attention of the Council, it has been unanimously resolved that the abrogation of the restrictive bye-law is, under existing circumstances, advisable, and a new bye-law has been framed providing for the early appropriation of the income derivable from the fund, together with the current subscriptions. By thus giving a practical demonstration of the working of the Benevolent Fund, even on a small scale, its advantages will become manifest, and a stimulus will be given to it which could not be expected to exist under the restriction imposed by the original bye-law. When it is known that all subscriptions to this fund are available during the current year, and that the number of votes at an election is regulated by the amount of subscription, it may be expected that many persons will be induced to support the fund who have taken no interest in it during the time that its appropriation was deferred to a future and probably distant period.

In framing the bye-law which is subjoined, containing the regulations for the distribution of the Benevolent Fund, it has been the desire of the Council to place in the hands of the Members and Subscribers the election of Candidates, subject to such restrictions only as the Charter requires. Thus it is the province of the Council, as guardians of the funds of the Society, to fix the amount to be distributed, and also to examine into the claims of all Candidates, and publish a list of those who are qualified. This being done, the Members and Subscribers will elect the requisite number of Candidates in the usual way.

It is probable that experience may suggest, from time to time, some practical improvement in the machinery adopted for regu-

lating the distribution, in which case such modifications as may be found expedient may be introduced in the form of an amended bye-law. In the mean time, the general plan, which has been maturely considered, will serve to bring the Fund into speedy activity, and give it that publicity which is likely to promote its increased support.

Among the expedients which are usually resorted to for augmenting benevolent funds, convivial meetings are said to be the most successful, and a dinner has been several times suggested as being desirable in the present instance. Although we have not taken a prominent part in reference to this proposition, we shall be glad to promote any effort which may be made in furtherance of the object.

Our appeals have hitherto been addressed to the heads and hearts of our readers; as a last resource we are prepared to try the magic efficacy of chloride of sodium; as we are told that no undertaking of the kind can flourish until the parties concerned have "eaten salt together."

EXTRACT FROM THE BYE-LAWS.

REGULATIONS FOR THE DISTRIBUTION OF THE BENEVOLENT FUND.

1. This Fund shall consist of donations and subscriptions annually made for that specific purpose, aided by such appropriation of a portion of the general funds, as the Society at their Annual Meeting shall think necessary, and the Council shall recommend the amount which to them may appear expedient.

2. The donations and the grant made at the Annual Meeting shall be invested in Government or real securities, in the names of not less than three trustees, to be appointed by the Council, who shall resign their trust when called upon by a vote of Council to do so. And no appropriation of any part of the principal shall at any time be made for distribution to the objects of the Fund.

3. The interest which shall accrue from the Fund, which shall be produced by such investment as aforesaid, together with the subscriptions which shall annually be made in aid of such Benevolent Fund, shall be applied in such manner as the Council shall at their fourth Monthly Meeting in every year direct, in the annual or other relief of such Members and Associates, or their Widows or Orphans, as are hereinafter mentioned.

4. The persons who shall be eligible to receive relief from the Benevolent Fund, shall be such Members and Associates of four years standing in the books of the Society, and the Widows and Orphans of such Members or Associates as shall be in needy or straitened circumstances: Provided that the Council may at their fourth meeting declare that any other Member, Associate, or Widow or Orphan of any Member or Associate, such Member, Associate, Widow, or Orphan, being in distressed circumstances, shall be eligible.

5. In all cases of relief from such Fund being required, a full statement in writing of the particulars of the case, authenticated in such manner, and accompanied by such evidence as the Council shall at their fourth meeting in every year direct, shall be forwarded, at such times as the Council shall in like manner direct, to the Secretary, and shall be by him forthwith laid before the Council.

6. The Council, if satisfied with the correctness of such written statements, and that the case is one deserving annual relief, shall direct the Secretary to write to the applicant, stating that the case may be brought forward at the next election.

7. In the month of November in every year an election shall be held, at such place and time, and in such manner, as shall be fixed by the Council at their seventh meeting in such year, and two month's notice in the published Transactions of the Society, or in writing, of the time and place of holding such election, shall be sent to every person entitled to vote thereat, and such notice shall contain a limitation by the Council of the extreme number of candidates that can be successful at such election.

8. The persons entitled to vote at such election shall be the Members and Associates of the Society, and the Donors and Contributors to the Benevolent Fund, as hereinafter mentioned.

9. Every Member of the Society who may not be in the receipt of, nor an applicant for relief out of, the Benevolent Fund, shall have twenty votes. Every Associate who may not be in the receipt of, nor an applicant for the like relief, shall have ten votes. Every person who shall at any one time have given to the said Benevolent Fund the sum of £5, shall have twenty votes, and the like number of votes for every similar sum of £5 given in like manner. Every person who shall, at any time within the space of a year before the election, have subscribed the sum of £5 and upwards, shall have ten votes for every sum of £5 so subscribed by him. Provided that no person shall be entitled to vote who, at the time of the election, shall be indebted to the Society.

10. Every person voting at such election, who may be entitled to vote in either of several characters, shall be entitled to vote in each of such characters.

11. Any person may vote by proxy, such proxy being a person entitled to vote.

12. In the event of an equality of votes, the Chairman shall have a casting vote.

13. As soon as may be after the election, a list shall be made of the number of votes each candidate has obtained.

14. The list of persons who may be chosen at each meeting shall be filled up with the names of those candidates who have obtained the highest number of votes; and such candidates shall be entitled to receive the amount of relief which the Council has previously settled.

15. If at any election there shall not be a sufficient number of persons chosen to exhaust the fund which may then be applicable for the purposes of relief, it shall be lawful for the Council to order the portion of the said fund, to which no person has become entitled, to be added to, and invested in like manner with such parts of the said Benevolent Fund as may already have been permanently invested.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

CONVERSAZIONE.

On Wednesday evening, October 13, a Conversazione was held at the house of the Pharmaceutical Society, when the usual Meeting-Rooms, together with the Museum and Laboratories, were opened for the reception of a numerous assemblage, comprising a large number of scientific and medical men, in addition to the Members and Associates of the Society.

Several objects of interest were exhibited, according to custom, and for many of these the Council were indebted to their scientific friends. Among these were some interesting specimens of native copper from North America; and a large piece of Malachite, which were kindly lent for the occasion by Mr. Tennant. In one of the specimens of copper, the presence of large quantities of metallic silver, imbedded in layers, was very beautifully shown, the calcareous matrix having been dissolved away by an acid.

There were also several specimens of glass, from Messrs. Claudet and Houghton, showing some of the recent applications of this substance for domestic purposes, in the manufacture of milk-pans, cream-pots, cucumber-glasses, and other glasses for horticultural purposes, &c. The glass of which these are made is a very superior kind of light-green glass, and they are sold at prices that must bring them into competition with those hitherto made of other materials.

The recently-patented Air-pump, of Mr. Knight, of Foster Lane, was an object of some attraction. We hope to be enabled to give a description of this very elegant and efficient apparatus, on some future occasion.

The Council were also indebted to Mr. Gilham, of Hackney, for several objects of interest, including the pearl oyster, pitcher-plant, &c.

To Mr. Williams, Secretary to the Astronomical Society, for some well-executed casts of medals, &c. made with *Gutta-percha.*

To Dr. Ure for the Ebullition Alcoholmeter, described in his paper published in the last number of this Journal.

To Mr. Whiting, of Beaufort House, for specimens of printing and embossing in colours.

To Mr. Hahnemann, of Regent Street, for specimens of talbot-types.

To Mr. Underwood, for a new form of funnel, by which evaporation is prevented during the process of filtration.

Among the other objects present may be mentioned specimens of the seeds, fruit, and plant of the *Jatropha curcas*, which had been kindly presented to Mr. Morson, the Vice-President, by Mr. Pitman, whose brother, now residing in Africa, has recently devoted some attention to their cultivation and the collection of the seeds, of which he gives the following account:—

"These physic-nuts are called by the Portuguese *Polga-nuts*, and are employed by them as a purgative, and also in the manufacture of soap. They are produced by a plant, the trunk of which is seven or eight inches in diameter, and from sixteen to twenty feet high, branching off like a young oak, and covering from ten to twelve feet of ground. They are propagated by slips, cuttings, or seeds. The first readily take root without attention, and in a few months acquire a large size. Slips planted on the 6th of April were full of leaves, blossoms, and fruit, by the end of June."

The oil obtained from these seeds is less active than that of the *Croton tiglium*, but it operates in small doses, and may prove a valuable medicine, being much more active than castor oil, and on this account, may probably be suited for administration in capsules.

A model of a Chinese Druggist's shop and house, being a correct representation of one of the principal Pharmaceutical establishments in Physic Street, Canton, made by a Chinese workman, together with several other objects relating to Chinese Pharmacy, formed interesting subjects of conversation. A drawing of the Chinese house was given some months ago in this Journal (vol. vi., p. 464), but no previous occasion had occurred of exhibiting the model itself to the Members of the Society. Mr. Morson, who obtained this model through a merchant visiting Canton, under whose directions it was made, has since added to his collection of Chinese curiosities, and on this occasion exhibited a complete collection of the apparatus employed in China for smoking opium, together with a series of highly-finished and coloured drawings on rice-paper, illustrating the injurious effects resulting from the abuse of this practice.

A large group of crystals of *Codeia*, weighing six or eight pounds, attracted some notice; also specimens of *Chinese Galls*, with the tannic and gallic acids prepared from them. These were furnished by Mr. Morson.

In connection with the *Chinese Galls*, Mr. Ingall, of the

Bank of England, exhibited, under the microscope, the insects which have recently been discovered within the galls. Drawings of this insect, which appears to have been hitherto undiscribed, were also shown. These drawings are being engraved, and will be published with a further notice in a subsequent number.

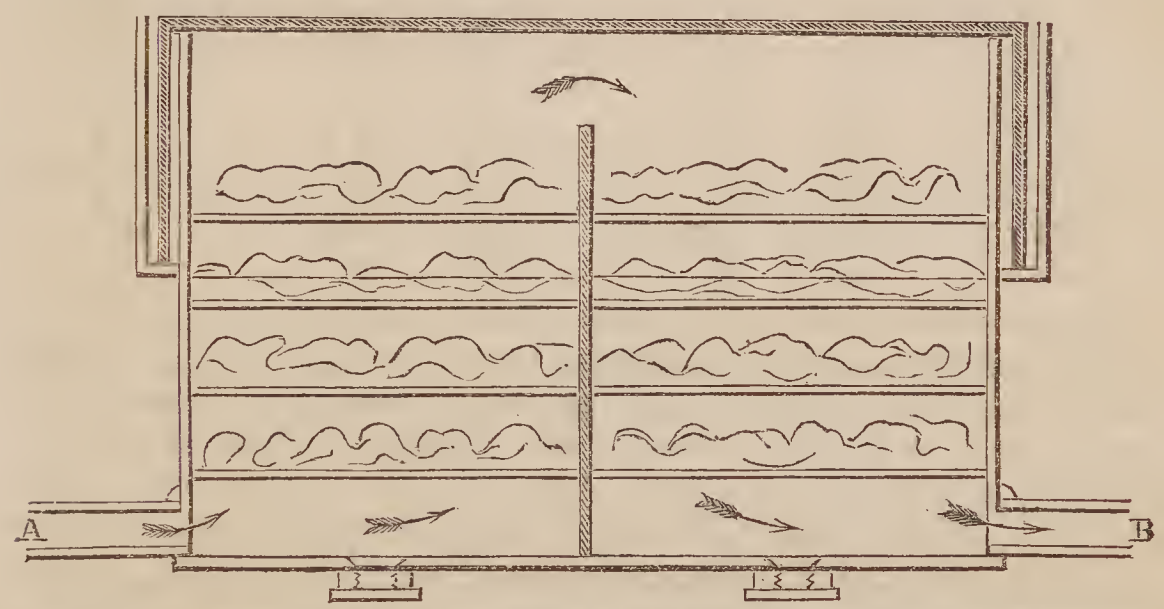
In the course of the evening, Mr. Leslie exhibited and described his improved gas-burners, meters, and purifiers, observing that—

The increase of the illuminating power of given quantities of gas must be based on sanatory and economic advantages. All the impurities in coal-gas were non-illuminative, and in combustion were dangerous to health, and injurious to the furniture, meters, and fittings.

It must be borne in mind, that, even supposing the gas to be tolerably well purified at the gas-works, it has subsequently to travel over long lines of foul deposits in the main pipes, so that if the public escaped one very common source of mischief, they were pretty certain of the other.

Mr. Leslie stated that it was his object to attack the gas at its entrance from the street-main, by causing it all to pass through a purifying apparatus in which the most searching investigation of the character of the gas took place.

The following diagram will serve to illustrate the method of purification :—



The gas enters at *A*, passes upward through four perforated trays, turns over the centre division, and descends through four similar trays to the outlet *B*. On these eight trays are placed various different materials for purification.

If there be sulphuretted hydrogen present in the gas, an absorbent is there to arrest it; if there be carbonic acid it is retained, and so with the products of ammonia, they also were attacked and conquered.

The gas then being deprived of these deleterious compounds, could be used with much less danger to the health of the inmates, and a smaller quantity of the so purified gas would give the required illumi-

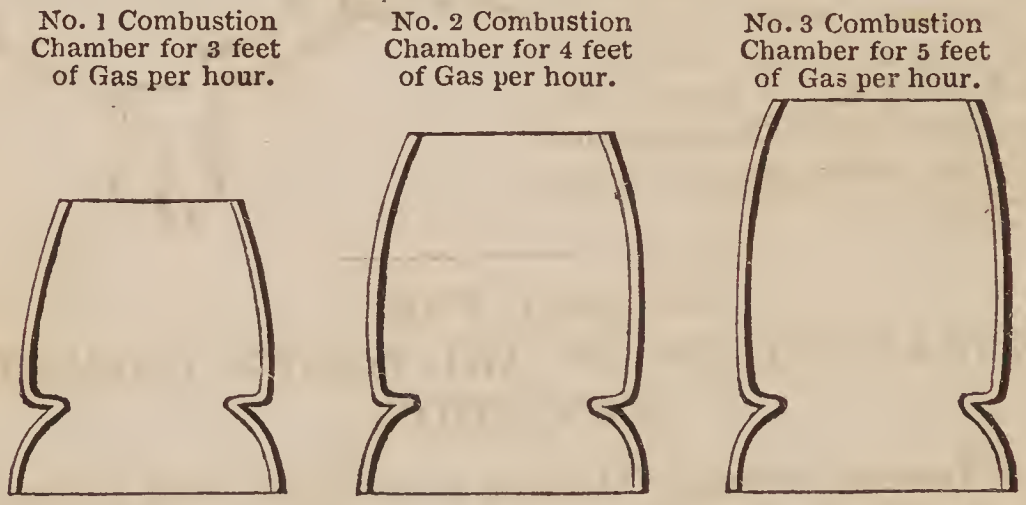
nation; and thus the process was based on those two important considerations—sanatory and economic.

Mr. Leslie also exhibited, on an experimental meter, a burner in operation, several of the members noting the time, while others recorded the simultaneous consumption of gas.

He showed that he obtained a great subdivision of any given quantity of gas by its passage up the twenty-eight small tubes of which the burner was composed. That each of these tubes being isolated, the atmospheric current played all around each of the twenty-eight portions of gas at the point of ignition, and the oxygen uniting instantly with the gas, produced a sheet of light. He thus simply brought the atmospheric current to the right place—the next point was to make it fully perform the required duty.

On studying the subject he felt satisfied that a given quantity of gas required a given space for the production of light, and that configuration was required as well as capacity.

How much gas had to pass, how much atmospheric current to supply the requisite quantity of oxygen, then became essential elements in the inquiry. The old forms of chimneys were abandoned, and his new glass combustion-chambers were exhibited. The following diagrams will give a clear illustration of the principle.


No. 1 Combustion Chamber for 3 feet of Gas per hour.
No. 2 Combustion Chamber for 4 feet of Gas per hour.
No. 3 Combustion Chamber for 5 feet of Gas per hour.

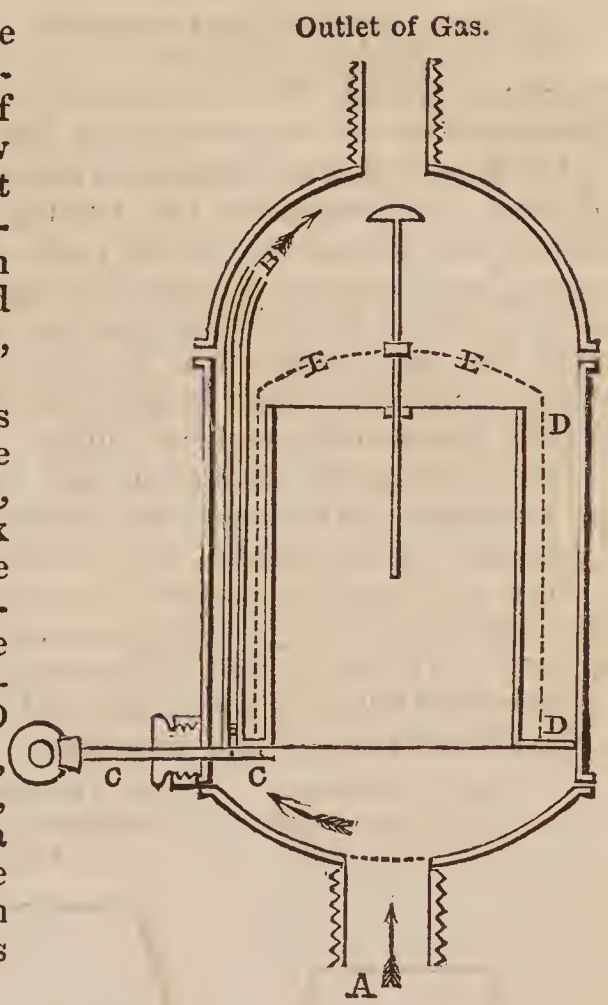
Mr. Leslie showed the importance of this new feature in gas lighting by several experiments. He commenced by placing a burner on the experimental meter, the time and the consumption of gas were noted by several persons present, and a beautiful light was produced from three and a half feet of gas per hour, using No. 1 combustion-chamber.

It was then shown that the same quantity of gas would be consumed giving scarcely any light at all, if he took off the combustion-chamber and put on an old glass chimney. The loss of light was striking, and the same consumption of gas was then accurately tested.

Mr. Leslie then proceeded to show the importance of the new principle in combustion, and stated that were he to substitute the combustion-chambers, Nos. 2 or 3, for the quantity of gas calculated for No. 1 combustion-chamber, that although the variations of capacity were very small, still the quantum of light would be diminished: all of which he demonstrated, showing the advantage to the consumers of gas, that with the same burner they could obtain any required amount of light, simply by varying the combustion-chamber.

Mr. Leslie having shown the beautiful light that could be produced from so small a quantity of gas per hour, proceeded to show how important it was to prevent the injurious consequences of sudden increased velocity of gas in the street-mains, and then described his new automaton gas economiser, of which we here give a diagram.

The gas enters at *A*, and *B* is the only conducting tube to the outlet of the gas. *C* is a slide, working in a gas-tight stuffing-box to increase or decrease the aperture of *B*, the conducting tube, according to the pressure of the gas, the outlet being partially closed in proportion to the pressure of gas. *D* represents a circular oil reservoir, *E* is the dome which floats in it, with a cone at the top, in which a small hole is left to prevent the entire shutting off of the light when any violent sudden pressure of gas takes place.



EXTRACT FROM THE TRANSACTIONS OF THE BRISTOL CHEMISTS' ASSOCIATION.

On Tuesday evening, October 5, a lecture was delivered before the Members of the above Association, by Dr. Herapath, on "The Physical Properties of the Atmosphere."

At its conclusion, the Chairman, after thanking the lecturer, in the name of his friends, for his very able and instructive address, called the attention of the Meeting to what he could not but consider a very interesting subject. He alluded to the recent examination of those students who had attended the late course of lectures on Materia Medica. He felt the more pleasure in introducing the subject as it would be his agreeable duty to present a prize (offered for competition at the commencement of the Course by one of the Council) to the gentleman who had gained the highest honours on that occasion. Previous to so doing he would request Dr. Staples, who had so generously delivered the Course, to state his opinion as to the general character of the examination.

Dr. Staples, at the request of the Chairman, had unaffected pleasure in testifying to the general attention of those who had

attended his class, and to their evident desire to acquire information. With respect to the Examination, he considered it highly creditable to all who had contended, and in the case of that gentleman, whose motto stood in the highest place, he assured the Meeting that on no previous occasion of a similar character had he known any set of questions more clearly and correctly answered. Though but *one* prize was to be awarded, and the superiority of the answers he had alluded to was very distinct, he could not refrain from complimenting that gentleman whose motto, "Juvenis," appeared second on the list. His replies were very much to his credit, and had he not been outstripped by "Spes" he would, with perfect satisfaction, have awarded him the palm.

The questions were,

1. Describe the drugs. 1 to 9. (they were four samples of aloes, myrrh, and the seeds of carrot, digitalis, stavesacre, and hemlock) in the following manner :—Name of the drug—whence obtained—name of the plant yielding it—natural order of the plant—if not a natural product, how obtained—the Chemical constituents—medical properties—if any specimen is adulterated name the substance used for the purpose.

2. Two salts are placed before you, what is the Chemical composition of each?

3. The process for making nitric acid, and the Chemical changes that take place.

4. Describe the process for making bichloride of mercury, and the Chemical changes which take place.

5. With what substances is Iodine adulterated, and how are such detected?

6. Given a sample of Alexandrian senna from the bale : separate the leaves of true Cassia from others that may be mixed with it, and name the various plants from which these leaves are respectively procured.

The mottoes, when examined, were found to correspond with the following names :—

No. 1. "Spes," .....Mr. E. Clift.
No. 2. "Juvenis," .....Mr. G. Corbould.

The prize, *Grey's Supplement* (Redwood), was then presented to Mr. E. Clift.

ON THE ATOMIC THEORY.

BY MR. R. W. GILES.

Read before the Members of the Bristol Chemists' Association, on Tuesday, September 7, 1847.

The Atomic Theory is generally understood to embrace two separate questions, which are nevertheless so perfectly distinct, that it will be proper and most convenient to classify them under separate heads. The reason for this divorce is, that the laws of combination which have been *proved* by actual investigation, and are therefore entitled to be regarded as facts, would suffer by being mixed up with any thing so purely hypothetical as the theory of ultimate atoms must be allowed to be; and as it is upon these laws that I shall endeavour to place most stress, on account of their immense practical importance, I shall as much as possible avoid exhibiting them as in any way dependent upon the corpuscular theory. And although it does happen that this latter explains very perfectly the cause of certain phenomena in combination, forcing the conviction upon our minds, that the relation of cause and effect exists between them — the laws of combination are entirely independent of any support from this circumstance, and will maintain their stability whether the other be received or not.

Following a chronological arrangement, I shall first notice the corpuscular theory of atoms, which preceded by a very long period the more recent discoveries of Wenzel, Richter, and Dalton. The view now generally entertained, is, that elementary matter is composed of atoms having the same character and properties as the whole. That these atoms (as their name imports, derived from *á priv.* and *τεμνειν to cut*) are impenetrable and indivisible, the atoms of the same substance being always identical in weight, form, and size, though differing from the atoms of other substances in these respects. That when substances unite one with another, the combination is the result of one or any number of atoms of the one exercising an affinity for one or more atoms of the other, producing particles of the compound body. There will therefore always be a correspondence between the weight of the atoms and the weight of the quantities which combine, the latter being always a simple multiple of the atomic weight.

I propose to review the circumstances which have marked the rise and progress of these opinions, as far as they can be traced, and shall endeavour to fasten their origin upon a very ancient school, hoping thereby to show that there must be some intrinsic probability in a doctrine, which, although in a mathematical point of view opposed to our preconceived notions, has yet found supporters amongst the most learned of all ages.

There is much reason to believe that Pythagoras, who lived in the sixth century before the Christian era, held these opinions, although the word *atom* was not applied by him, but it is supposed that the same dea was intended to be conveyed by the term *monad*, meaning unity, an equally applicable denomination, and we learn that these monads were possessed of size. It has even been contended that this philosopher had some acquaintance with the doctrine of definite proportions,

since he is recorded to have taught *That all things were produced according to number*. This doctrine, however, very quickly degenerated amongst his followers into an absurd and superstitious veneration for *numbers themselves*, as though they had a real existence, and had exercised a magical influence in the creation and maintenance of the world. Neither is there anything incredible in this perversion of the sublime truths of philosophy, since in those ages a long probation was required before the pupils were admitted to more than a glimpse of the hidden stores of learning, which were cautiously disclosed to a favoured few. If it be true that Pythagoras entertained this theory, it will be at once suspected that he borrowed it from the Egyptians, with whom he is known to have spent his youth in study, and from whom many of his tenets were derived.

We may please ourselves if we like by subscribing to the probability of these speculations, but our attempts at further exploration are baffled by the mystery which especially characterised the schools of Egypt. It is not, however, unreasonable to assign a very superior philosophy to the sages of that country. Indeed, the belief is now gaining ground that the miracles which the priesthood of Egypt and Chaldea perpetrated under the guise of the occult sciences, and which until lately it has been the fashion to discredit, were simply the offspring of a knowledge of physics scarcely inferior to that of the present day. This philosophy was carefully concealed from the uninitiated, the object of its guardians being power to themselves rather than the advancement of science.

"There are traces," says Bishop Berkeley, "of profound thought in the Platonic, Pythagoræan, Egyptian, and Chaldaic philosophy. Men in those early ages were not overlaid with languages and literature. Their minds seem to have been more exercised and less burthened than in latter times, and (as so much nearer the beginning of the world) to have had the advantages of patriarchial lights handed down through a few hands."

The existence of a philosophy so advanced as has been imputed to the Egyptians, is rendered more credible by a parallel fact well authenticated. The Brahmins of the east are the custodians of tables for calculating the motions of the heavenly bodies, and rules for determining the phases of eclipses, which could not have been compiled without considerable knowledge of astronomy, geometry, and arithmetic, and yet these are generally allowed to be coeval with the patriarchal ages.

The theory of atoms has been recognised by the eastern sages from the earliest period without (apparently) exciting any of that opposition which has attended it in the west.

In the century succeeding that in which Pythagoras flourished, we find Leucippus advocating his doctrines, and as the obscurity which enveloped the teaching of the first was dispelled in the case of the latter, he has come to be regarded as the originator of the theory. Leucippus was followed by his disciple Democritus, by the Epicurean School (with whom the subject has been more particularly identified), and by many philosophers of note.

Plato appears to have entertained very confused ideas upon this question, borrowing a little from one system and a little from another, attaching himself upon the whole to that party who took their stand

upon the mathematical axiom of infinite divisibility, and at the same time retaining certain opinions, in regard to the fixed shape of elementary parts, which we consider necessarily involves the existence of unchangeable atoms.

Although the broad principle of the corpuscular theory is thus shown to have been common to many in these early ages, yet the detailed ideas of its several supporters were considerably at variance. Thus, the Epicureans believed that there was only *one* kind of elementary matter, existing from the beginning in a state of minute *atoms* diversified in form, there being innumerable individuals of every figure; that these atoms were gifted with motion, which had brought them into collision in all possible directions, and that they had thus aggregated themselves, in every conceivable manner, the different forms of resulting matter being dependent solely upon the peculiarity of their arrangement and the mechanical differences of their atoms. This was an antagonist error to the doctrine, at an earlier period propounded by Anaxagoras, to the effect that there were as many varieties of elementary atoms as there are distinct substances, his notion of an atom being identical with our definition of a particle, excepting that he did not suspect the possibility of resolving it into simpler parts. There was another theory respecting elementary matter which even now finds a home amongst popular errors, I allude to the supposition that there were four elements, *earth, air, fire, and water*, from which all nature had been called into being. This also formed a part of Plato's composite creed, and only becomes intelligible if we suppose it to have been a metaphorical mode of expressing the four conditions which matter was supposed capable of assuming—the solid, the gaseous, the igneous, and the liquid. It is now believed that there are fifty-five or fifty-eight simple bodies or elements; no means having yet been devised for reducing these bodies to a simpler condition.

The question of the atomic theory continued to be agitated, with intervals of rest, through the intermediate ages, down to modern times, when we find Newton amongst its advocates, and Leibnitz, Descartes, and others in opposition to it. Neither was there any prospect of a conclusive victory on either side, until the discoveries of Dalton brought new arguments in favour of the corpuscular theory to light, strong enough to terminate the controversy by giving it a preponderance of probability which it appears hopeless to contend against. What has been said of the undulatory theory of the nature of light, applies with equal force to the theory of atoms. "If it be not true, it deserves to be true, for the luminous explanation it affords of phenomena otherwise unintelligible." Amongst these we may class the phenomena of crystallization. It would be difficult to assign a reason for the uniformity that characterises the formation of crystals if we refused to suppose them made up of parts themselves unchangeable, endowed with a tendency to arrange themselves in a definite matter. It could scarcely be that the permanency of form should be maintained in the whole, unless the parts also possessed a stability of size and figure.

Philosophy has been said to be "the art of deciphering the mysteries of nature," and every theory which can explain the phenomena, has the same evidence in its favour that the key of a cypher can have from explaining that cypher. Now the theory of atoms *does* explain

all the phenomena which can be affected by the ultimate constitution of matter while the opposite hypothesis does not, therefore we must be satisfied to receive it as true, at least until some other better qualified to command assent has been proposed. It must however be allowed that the objection founded upon the mathematical axiom "that whatever possesses extension must be supposed capable of division," is too plausible not to form a serious impediment to the reception of the corpuscular theory, and it would be most desirable to avoid collision between the two. I conceive that Newton's hypothesis releases us from this dilemma, and enables us to hold fast the doctrine of ultimate atoms without violating those principles which had hitherto been considered incompatible with it.

This most eminent of all philosophers supposed the atom to be the form in which matter was first called into existence—that the size and form of these atoms were such as best conduced to the purposes they were designed to fulfil—that having been so created, they are incapable of separation by any means which has been since applied to them, although they may be *conceived* divisible by the exercise of the Divine will, which now acts to hold them together. On the other hand, matter, the result of the operation of certain known laws upon these created atoms, may be separated, fractured, decomposed, and re-combined in other forms, being in all their changes subject to the operation of the same laws which they have obeyed from the beginning.

Respecting the form or figure of the atom, nothing can be positively known; there have been two hypotheses proposed, the one supposing them to be polyhedral, and the other spheroidal, but upon neither side does the reasoning appear sufficiently strong to warrant us in regarding it as proved.

Indeed, it seems very probable that the atoms of different substances differ themselves in figure in various degrees, and this supposition will serve to explain some of the phenomena of isomorphism. The relative bulk of atoms may perhaps be calculated by dividing the atomic weight by the specific gravity; we may at least be certain that this process, when applied to matter in the gaseous condition, will furnish us with a series of numbers representing the inverse proportion of the numbers of the atoms in equal volumes, and consequently the direct proportion of the combining volumes of the gases. And if we assume that the space allotted to each atom depends solely upon its actual bulk, apart from any property of attraction or repulsion, which might keep them at a greater or less distance from each other, uninfluenced by, or not in constant proportion to their respective bulks, the same numbers will also present us with a scale of the comparative bulks of the atoms.

This will show us that the theory of volumes is simply a consequence of the atomic theory, and as readily explicable upon its principles as are the phenomena of definite proportions in the combination of matter in its more solid forms.

The only manner in which I have seen this rule worked out appeared unsatisfactory, and it occurred to me that this might be owing to the promiscuous comparison of solids and gases without proper precautions, and that results more in harmony with the simplicity that characterises these matters generally might be obtained if we were careful to ascertain the specific gravity of the vapours of solids before comparing

them with the gases. With this limitation, the rule in the few instances to which I have applied it succeeds perfectly, and bears strong internal evidence of truth, the ratio of the numbers so procured corresponding precisely with the volumes of the gases or vapour, which investigation has shown to have a tendency to combine. I would not be understood to claim this as a discovery of my own, although it is new to me, and I am not able to give any better authority for it.*

	Atomic Weight.	Specific Gravity.		Atomic Bulk.		Equal Volume by Experiment.
Oxygen	8.	1.1026	...	7.25	...	50
Hydrogen	1.	0.06896	...	14.50	...	100
Chlorine.....	35.42	2.47	...	14.34	...	100
Nitrogen	14.15	0.9722	...	14.55	...	100
Carbon	6.12	0.4215	...	14.49	..	100
Iodine.....126.3		8.716	...	14.49	...	100
Sulphur	16.1	6.6	...	2.44	...	16.66

Although it has been said that the corpuscular theory is entirely hypothetical, it is desirable that we should recognise it in order better to understand that which follows, and because the language of Chemistry has become tinctured by a general acceptation of its principles; but you will remember that the subject which I am now approaching is simply a generalisation founded upon a series of indisputable facts, and confirmed by all subsequent enquiries, while the other is a speculation whether the phenomena involved may not be accounted for by supposing combination to be the effect of a union of atoms, these atoms being characterised by a difference in weight. Thus, when we find that eight parts by weight of oxygen unite with one by weight of hydrogen, the cause of this constant proportion is accounted for by the supposition that the weight of the atom of oxygen is as eight, while the atom of hydrogen is as one, and that the combination is produced by a union of atom with atom. It is because this view of the case has been generally taken that we are accustomed to such phrases as the *atomic weight* of a body, which would be more strictly termed its equivalent or combining number; and again, we frequently hear of an atom of a substance being employed when an equivalent would be the more matter of fact mode of expression.

But taking leave of this *quæstio vexata*, we turn to the subject of combination, which at the same time that it affords some of the most convincing arguments in support of the first, is also the chief cause of the interest attached to it. The phenomena of combination have been observed to be confined within certain limits, and an inquiry into the nature of these limits has resulted in the recognition of three grand and most important laws, viz.

1st. That any one substance will combine with other substances in certain proportions only.

2d. That these proportions may be expressed by fixed proportional numbers, or in other words, that every substance may be represented by *a* constant number, indicating the proportions in which its several combinations will take place.

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* I have since been shown a more striking table of this kind in *Fownes' Manual of Chemistry*, hydrogen being taken as the standard of specific gravity. The fanciful question of atomic bulk which originated the inquiry in this case is there omitted.

Thus, hydrogen is represented by 1, chlorine 36, iodine 126, bro mine 78, sulphur 16, oxygen 8, &c., meaning that 1 part of hydrogen will unite severally with 36 chlorine, 126 iodine, 78 bromine, 16 sulphur, and 8 oxygen, and when these substances form other combinations either amongst themselves or with new bodies, these proportional numbers will still govern their affinities, all exceptions being within the limitations of the third law.

3d. That when one body *A*, combines with another body *B*, in two or more proportions, if we suppose the quantity of *A* to remain the same, the several quantities of *B* will bear a very simple ratio one to another (being in fact simple multiples of the proportional numbers spoken of in the second law).

The first law is the evident deduction from the fact that the constitution of any body is invariable. As soon as Chemistry had progressed to a state of proficiency that enabled its followers to conduct their experiments with accuracy, it could not fail to be observed that the analyses of the same compound substance always yielded the same constituents in the same proportions, and that these simple components in that precise proportion were alone capable of reforming that substance.

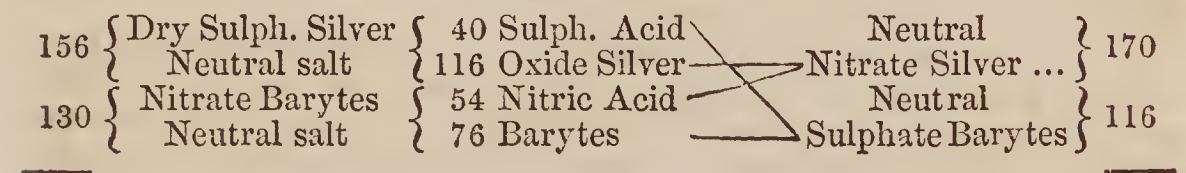
Thus nitrate of potash would always be formed by a combination of fifty-four parts anhydrous nitric acid, and forty-eight parts potash, and no other mode of producing this salt can ever be devised. The cause of a like regularity in all bodies is doubtless that which has been already proposed, viz., that those numbers correspond to the weight of the atoms (in the example before us, particles) and that every atom of the one seizes upon an atom of the other, and attaches itself to it; but in order to exclude this theory from any positive interference, it is preferred to consider the phenomena as prime facts, and they are therefore merely stated as a general law, "that substances combine in fixed proportions."

This is said to have been first discovered by the Saxon Chemist, Wenzel.

The first law teaches that a constancy is maintained in the relation which exists between each pair of bodies in combining. The second presents a much wider view of this proportional system, that as a fixed weight of *A* unites with a fixed weight of *B*, and with fixed weights only of all other substances, so the quantities of these substances which unite with the given weight of *A*, will also remain unaltered in their other combinations.

For instance, 1 hydrogen combines with 8 oxygen in the formation of water, and with 36 chlorine to produce hydrochloric acid, and accordingly 36 chlorine unites with 8 oxygen to form hypochlorous acid. A review of the combinations of all substances and a comparison of the quantities in which several unite with a fixed weight of any one, will therefore enable us to represent them all by numbers indicative of the proportions in which they are disposed to combine. But this conclusion was not reached except by slow progressive steps, commencing with some observations published also by Wenzel, A.D. 1777. Wenzel remarked that when two neutral salts decomposed each other, the resulting salts were also neutral, from whence it follows that the quantities of the acids and the quantities of the bases employed, possess the same saturating power. In order to show how much the matter

of this law is contained in the phenomena noticed by Wenzel, we will take an instance from the mutual decomposition, of sulphate of silver and nitrate of barytes. Suppose 156 grains of dry sulphate of silver added to 130 grains of nitrate of barytes, cross decomposition will take place, as shown in the following diagram:



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Now since 40 grains sulphuric acid, and 54 grains nitric acid are each capable of saturating either 116 grains oxide of silver, or 76 grains barytes, we must suppose that in those proportions the saturating powers of the two acids are equal, and the numbers denoting these quantities are consequently attached to these acids, and called equivalent numbers. In like manner those quantities of the bases which we have seen to possess to the same extent the power of neutralising both acids, must be considered equivalent quantities.

Pressing forward in the direction indicated by Wenzel's researches, Richter pursued these experiments with the view of determining the relative capacities of saturation of the several acids and bases, and to express them by a scale of numbers which might be appealed to in after operations. This table deserves respect, as the first attempt to define those proportional numbers which have since been found to hold good throughout all the combinations of matter. I here present you with some extracts, which will illustrate the style of the whole:—

RICHTER'S EQUIVALENTS.

Alumina	525	Carbonic Acid	577
Magnesia	615	Muriatic	712
Ammonia	672	Oxalic	755
Lime	793	Phosphoric	979
Soda	859	Sulphuric	1000
Strontian	1329	Nitric	1405
Potash	1605	Acetic	1480
Barytes	2222	Tartaric	1694

It will be seen that the numbers affixed to the several bodies in this table are very high, rendering it unsuitable for frequent reference; it was also incomplete, and it becomes important to ascertain if the rule applies to the elementary bodies as well as to their compounds. Yet strange to say, this inquiry does not appear to have suggested itself for a period of nearly thirty years, during which time no further progress was made, than to continue the investigation of the saturating power of more acids and bases in imitation of Richter. This brings us to the date of Dalton's magnificent discoveries in the early part of the present century, between the years 1803 and 1808. In the latter year his *New System of Chemical Philosophy* was published, which at the same time that it propounded new views as regards the distinct and simple relation therein proved to exist between the several compounds formed by the union of the same substances, and explaining all the phenomena of combination by representing it as the effect of the atomic

theory, properly so called, in a manner hitherto unsuspected, if we except the casual notice of the same doctrine by Higgins in 1789, also perfected this table of proportional numbers, establishing the universality of the law by including the elementary substances, and reducing the numbers to a more simple series. Daltonat once brought into practice the principles which he had declared, appending to the work last mentioned, a table of the equivalents of such elementary bodies as he had investigated. Similar tables have since been constructed, embracing all the simple substances known, and a comparison of their respective systems; their resemblance and minor differences will conclude all that need be said of the second law.

	Dalton.	Thomson.	Wollaston.	Berzelius.
Hydrogen	1.	.125	1.25	12.5
Carbon.....	6.	.75	7.5	75.0
Oxygen	8.	1.0	10.0	100.0
		&c., &c., &c.		

The equivalent numbers shown in each of these tables, being not positive but relative only, it will obviously depend upon our selection of the unit or standard of comparison what those numbers will actually be, and as this selection is entirely arbitrary, it is not to be expected that all the compilers of tables should have coincided in their choice. Undoubtedly, it would have been more convenient had they done so, inasmuch as it would have been a step towards giving to Chemistry a universal language; but facts are not altered by this want of identity, provided the same proportions are strictly retained.

For instance, if the combining weight of oxygen is eight times that of hydrogen, it is perfectly immaterial whether we represent them by one and eight, or by ten and eighty, both methods equally indicating all that we know of the fact.

Accordingly, we find that Thomson, Wollaston, and Berzelius, have agreed upon oxygen as their standard, having been influenced in their selection by the vast range of its affinities; but they all differ in the numerical value assigned to it. Thus, with Thomson it is 1, Wollaston 10, Berzelius 100, as shown in the table. On the other hand, Dalton, followed by English Chemists generally, has preferred hydrogen, which having the advantage of possessing the lowest combining weight of any known substance, appears to be indicated as the natural unit of the scale.

It is sometimes necessary to render numbers from one scale to another; and as Berzelius's numbers are generally employed by Continental Chemists, we might find a difficulty in understanding their works, if we were not previously cautioned of this discrepancy. To convert any number in Thomson's scale to its proper value in the hydrogen scale, it is only necessary to multiply by eight. The same process, with a proper attention to the place of the decimal point, will serve for Wollaston and Berzelius.

Having ascertained the equivalents of all the elementary substances, there is no difficulty in calculating that of any compound whose constitution is known, the equivalent of the compound being always the same as the sum of the equivalents of its parts. This is also made perfectly intelligible by the theory of ultimate atoms. Thus—

The equivalent of water is 9, because it is composed of $\left\{\begin{matrix}H = 1\\O = 8\end{matrix}\right\}$ 9

" soda 32, " " $\left\{\begin{matrix}Na=24\\O = 8\end{matrix}\right\}$ 32

" hydro-chloric acid 37, " $\left\{\begin{matrix}H = 1\\Cl =36\end{matrix}\right\}$ 37

An argument in favour of the hydrogen scale has been drawn from a supposition that the equivalents of all substances would prove to be simple multiples of that of hydrogen. In many instances, experiment has corroborated this assumption, but as there are exceptions (which may, however, prove to be errors of manipulation), the argument attempted to be derived from the fact must be, for the present at least, resigned.

Previous to the discoveries of Dalton, as early as the year 1789, Higgins published a *Review of the Phlogistic and Antiphlogistic Theories;* and in the course of the work asserted most distinctly that one atom of sulphur united with one atom of oxygen to form sulphurous, and with two atoms of oxygen to form sulphuric acids, also that the combinations of nitrogen with oxygen were as one atom of the first to one, two, three, four, and five atoms of oxygen, producing respectively nitrous and nitric oxides, hyponitrous, nitrous and nitric acids. Had these propositions been followed up, little would have remained for Dalton to discover; but Higgins seems not to have attached any importance to the subject, and having once mentioned it in this casual manner, the subject is allowed to be forgotten without having excited the attention or aroused the further investigations of Chemists. This circumstance can therefore scarcely be considered to detract from the originality of the after discoveries of the venerable Dalton, who, by a sublime faculty of generalisation, arrived at the happiest conclusions as regards general principles from the regularity which had as yet been observed in a comparatively few instances.

Dalton announced his views in these words, "If there are two bodies, *A* and *B*, which are disposed to combine, the following is the order in which the combination takes place, beginning with the most simple, viz.

1 atom $A + 1$ atom $B = 1$ atom C binary.
1 " $A + 2$ " $B = 1$ atom D ternary.
2 " $A + 1$ " $B = 1$ atom E "
1 " $A + 3$ " $B = 1$ atom F quaternary.
3 " $A + 1$ " $B = 1$ atom G "
&c. &c.

Without dwelling upon the minutiæ of his proposition as to the order in which these combinations occur, it will be sufficient to remark that when two bodies combine in many proportions the varying quantities of each are not indefinable, but subject to the controul of a very positive law. The larger quantities are, in fact, always simple multiples of the equivalent number (or, as Dalton would have said, of the atomic weight). Dr. Dalton supported his opinions by publishing shortly afterwards a description of the different compounds formed by oxygen with hydrogen, sulphur, nitrogen, carbon, and phosphorus, and the investigations of the indefatigable Berzelius, Thomson, and others, have since proved their applicability to all classes of chemical combinations.

Analysis of the different compounds of any pair of bodies, when they unite in several proportions, will supply us with a series of combining numbers, only one of which can actually be the representative of the equivalent, and it has sometimes been a matter of extreme nicety to select the true term for this series. This selection can only be made upon a careful examination of all its combinations, and a joint consideration of other circumstances which throw a light upon the subject. Much assistance in this way may be gained from observation of the proportional volumes which are inclined to combine when the substance under examination is reduced to the gaseous state, a regularity in this respect having been pointed out by Gay Lussac, and already shown to be closely allied to combination by weight. For example, the only known compound of nitrogen with hydrogen is ammonia, and we ought therefore to regard this, according to Dalton's rule, as a binary combination wherein an equal number of atoms of each are engaged; but analysis shows it to be composed of fourteen parts by weight (or one equivalent) of nitrogen with three by weight of hydrogen. We must, therefore, either admit that this is an exception to the rule (a very arbitrary one be it remarked) or we must confess ourselves in error in our former estimate of hydrogen as one. In this uncertainty we refer to the number of volumes of each which are taken to produce this substance, and finding that one volume of nitrogen with three of hydrogen are required, we no longer hesitate to pronounce it a quaternary combination of three atoms of the latter to one of nitrogen.

Again, when a body is found to belong to the same isomorphous class as others about whose atomic constitution we have already convinced ourselves, it is a strong argument, I may say, a conclusive argument, that the doubtful body is similarly constituted. Specific heat and specific electricity also help to clear up any doubtful cases. There yet remains a class of compounds which do not at first sight appear explicable upon any of the foregoing hypotheses, and seem, until further examined, to militate against the theory of atoms. Peroxide of iron is a familiar instance of this sort; here the iron exists in the proportion of twenty-eight, or one equivalent, and oxygen in the proportion of twelve, an equivalent and a half. In all sesqui-salts, the electro-negative and base are thus related; but how can we conceive an atom indivisible as it has been defined, separating into halves to unite itself with the iron? Such a supposition would be inadmissible, and fortunately is not required, the difficulty being removed by imagining the atoms to form themselves into groups of five, three atoms of one substance attaching themselves to every two atoms of the other. In this way, all fractions of equivalents are disposed of, and in the organic kingdom we contemplate without dismay, such complicated substances as those made up of C_{24} H_{22} O_{22}, and others equally, or still more formidable.

In the foregoing remarks, I have endeavoured to give a plain description of the steps by which the atomic theory has advanced and become perfected, preserving studiously the character of an historian, save when it seemed necessary to separate Dalton's discoveries from the debateable theory with which he has identified them. When kept distinct from this, they offer no weak point, and compel the acquiescence

alike of him who cavils at the doctrine of atoms, if such there still be, as well as of the more enthusiastic believer. The latter will, however, always enjoy this great advantage, that he will realize a more intelligible and satisfactory picture of the system of combination than the other can possibly do. Convinced that matter is a collection of substantial atoms, he will behold in every compound body little groups of twos, or threes, or fours, as the case may be, clustering together like members of an undivided family, the affinity existing between them bearing the same superior relation to the cohesion that holds the several groups in one mass, as do the sacred ties of consanguinity in the human race to that mere social fellowship which makes man desire intercourse with his kind.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MEDICINAL AND ECONOMIC PROPERTIES OF THE SAPINDUS SAPONARIA, SOAP BERRY, OR BLACK NICKAR TREE.

BY W. HAMILTON, M.B.

The Sapindus Saponaria, whose black and wrinkled berries of a globular form, and in size resembling a gooseberry of the medium description, have long been familiar to those who have visited the sunny shores of the islands within the tropics, by the name of *Soap Berries*, from the familiar use to which they have been long applied by the laundresses of the West Indies, is a tree of some thirty feet in height, with a trunk of about two feet in circumference, clothed with a greyish or ash coloured bark, and furnished, towards its summit, with a number of branches bearing pinnated leaves of from three to five pair of ovate lanceolate leaflets, about three or four inches in length and about five quarters of an inch at their greatest breadth, acuminated at either end; the rhachis, or common footstalk of these leaflets is bordered by a membraneous wing between each pair, expanding to its greatest breadth about midway between them, and contracting from thence in both directions.

Small, white, inconspicuous blossoms issue in the decline of the year, in loose spikes from the extremities of the smaller branches; these contain five fertile and three barren stamina, the filaments of which are nearly alike in length, protruding beyond the five-petalled fimbriated corolla; the five fertile ones are terminated by didymous anthers, while the three barren filaments are crowned, each by a triangular gland, the purposes of which in the vegetable economy have not, I believe, as yet been satisfactorily determined by vegetable physiologists. The ovary presents an appearance of three lobes; or, more correctly speaking is formed of three distinct ovaries concreted into one;

and hence, we not unfrequently find two or three berries connected at their base, of which two examples are in my possession. The average weight of eight of these berries, after having been kept for upwards of ten years, was 36.8 grains, of which about 14.5 belonged to the black shining globular seed or nut which they inclosed; giving about one-fifth for the weight of the seed, and four-fifths for that of the softer matter which constitutes its covering.

From the circumstance of the flowers presenting only five out of the eight stamina which they contain, furnished with fertile or polleniferous anthers, and this number corresponding so accurately with that of the petals which compose the corolla, the natural place for this tree in the Linnæan method of arrangement appears to be in the class Pentandria, rather than Octandria, to which it has commonly been referred; for the three barren stamina can hardly be regarded otherwise than as three glands elevated on pedicels, whose contribution to the process of reproduction of the species, little as it may be understood in the existing state of our botanical knowledge, differs undoubtedly from that of the polleniferous anthers. It would be an interesting and instructive operation to remove in one case the polleniferous stamina, and in another the glanduliferous one, guarding the ovaries from impregnation by the pollen of other flowers on the same or adjoining trees, and watching with care the result. Such experiments, however, to be in any degree conclusive, should be made in the places in which the soap-berry, or black nickar-tree, as it is frequently termed, flourishes beneath the sun of its native climate. As tending to throw light on some of the yet unrevealed mysteries of vegetable life, such experiments would amply reward the patient undertaker—although from the rapid extension of a less artificial system, their effect in facilitating the correct disposition of the genus, according to the principles of the Swedish father of botany, would be immaterial.

But this is wandering from the strict path of Pharmaceutical inquiry into the endless labyrinth of physiological romance.

The fruit of this tree, which is extensively dispersed throughout the Archipelago of the Antilles, is the only produce which has as yet, as far as I have been able to learn, been applied to any useful purpose—although it is but natural to presume that both the timber and the bark admit of being made to contribute to the wants of man. Barham, indeed, relates a strange story, which would be somewhat difficult of belief did it rest upon a meaner authority, that "the ashes of this tree will spoil a great quantity of other ashes for scouring or making potash"—he makes this statement, however, on the reports of others, and not upon any experience of his own, and subjoins this very

natural and obvious remark, that it "seems strange, there being such a soapy or scouring property in the fruit of it."

Alkaline salts being, as far as experience has hitherto gone, an indispensable ingredient in the composition of vegetables, can we account for the soap-berry tree furnishing a solitary exception to this universal rule, or can we believe that the whole alkaline constituent of the stem, leaves, and branches is expended in the formation of the fruit? The question is full of interest, and its investigation can hardly fail to prove instructive.

Is this antalkaline property of the ashes peculiar to any particular season of the year—to the period, for example, succeeding the first formation of the berry—or is it to be found equally present at other seasons?

Does it arise from the predominance of an acid, or from any accidental peculiarity in the composition of the soil?—and cannot this singular property, if found to possess a substantial existence, be converted to some useful purpose in medicine, domestic economy, or the arts?

The fleshy substance which forms the capsule or covering of the seed, when rubbed with water forms a lather exactly resembling that of soap in appearance, and possessing the same detersive properties; a quality which has led to its very general employment for the purposes of washing in the various islands which constitute the extensive Archipelago of the West Indies. Its employment for this purpose, however, has greatly declined, from an opinion which has widely prevailed of its injurious effect upon the articles subjected to its detersive operation. Brown, speaking of the soap-berries, informs us, that "a few of them will cleanse more linen than sixty times their weight of that composition (soap), but they are rather too sharp, and observed to corrode or burn the linen in time, and the water in which the tops or leaves have been steeped or boiled is observed to have the same quality in some degree." And, after the lapse of more than half a century from the date of Brown's remark, I heard the same charge repeated, and the same reason assigned for the preference given to artificial soap.

To what are we to ascribe this destructive property?—and might it not be so far counteracted by the aid of science as to render these berries still economically available for the service of the laundry.

These berries appear to contain a natural soap, in which perhaps the alkali exists in a state of greater purity than in the ordinary soaps of commerce! But, according to Brown, the leaves and tops partake of a similar quality. How, then, is this to be reconciled with Barham's statement of the injury they do to alkaline salts by admixture?

Upon referring to the third edition of Lewis's *Materia Medica*, published at Dublin in 1769, I find these berries, noticed at page 238 of the second volume, under the name of *Saponariæ Nuculæ*, or Soap Berries; but the description of the fruit is slightly inaccurate—at least as far as my experience goes—for I have never seen that transparency of which he speaks, admitting the black seed to be seen through it; possibly the berries he saw belonged to a different species. As, however, his account is curious, and may not be familiar to those whose medical literature does not go back three-quarters of a century, I trust I may be pardoned for transcribing it here.

"SAPONARIÆ NUCULÆ.

"NUCULÆ *saponariæ non edules, C. B. Saponariæ sphærulæ arboris filicifoliæ. J. B. Baccæ Bermudenses, Marloe.* SOAP BERRIES: a spherical fruit about the size of a cherry; whose cortical part is yellow, glossy, and so transparent as to show the spherical black-nut which rattles within, and which includes a white kernel. It is the produce of a small tree, growing in Jamaica and other parts of the West Indies, called by Sir Hans Sloane, *prunifera racemosa, folio alato, côsta mediâ. membranulis utrinque extantibus donata. fructu saponario.*

"It is said that this fruit, at least its cortical part, has a very bitter taste and no smell; that it rases a soapy froth with water, and has similar effects with soap in washing; that it is a medicine of singular and specific virtue in chloroses, and that a tincture or extract is preferable to the berry in substance, from whence it may be presumed that its soapy matter, like that of the *Saponaria*, is dissoluble in spirit. Its medicinal virtue was first published by Marloe in a letter to Mr. Boyle; but the fruit having been concealed under the name of *Bermudas Berries*, its use died with the author. That Marloe's *Bermudas Berries* were the same with the *Soap Berries* of America, had been suspected by some, and was confirmed by Dale in examining the Bermudas Berries which Marloe had left under that title behind him. They are still, however, unknown in practice and in the shops."

Upon referring to Dale's *Pharmacologia*, edit. 3d, Londini, 1737, I find these berries noticed at p. 309, under the head of Saponaria Arbor, and, among a multitude of synonymes, the *Baccæ Bermudenses* of Marloe's obs. on soap berries, with the following history, which may be interesting to many who cannot obtain access to the original work:

"*Baccæ Bermudenses*—Marl. Obs. Soap Berries. In insula Jamaica et alibi in Indiæ Occidentalis oritur. Octobri fructus maturescit. *Usu.* Fructus cum jam siccus sphæricus, coloris ex rubentis, Galla minor, hilo amplo, sapore amaro, odore nullo; unicum rotundum nigrum ossiculum continens. *Vires.* Multum commendantur adversus chlorosin. Marl. Obs. Baccæ ad chlorosin singulare et specificum medicamentum sunt, post chalybeata incassum usurpata morbum illum debellantes et sanantes. Spiritus, tinctura, aut extractum exhibenda sunt potius quam baccæ crudæ. R. D. p. 134. Europæus horum usus in medicina à D. Marloe orbi literato primum communicatus est, per modum Epistolæ à medico quodam rustico, ad egregium virum D. Boyle scriptæ. Verum cum nomen hoc adeo ænigmaticum esset, ut difficulter conjici possit quid essent et duo ex amicis meis, quos super hac re consului, de iis diversum sentirent,

uno Palmæ cujusdam semina esse opinante ; altero hujus arboris fructus, in cujus opinione confirmatus fui a prædicto D. Finch, qui me corum nonnullis, è cistula propria D. Marloe manu BERMUDÆ BERRIES inscripta desumptas donavit."—*Sect. Sexta, de Arborius pruniferis* xvii. *de Saponaria arbore*, p. 309.

These berries are unnoticed in the London Pharmacopœia of 1745, or in any subsequent edition.

A tincture prepared from the bruised seeds is spoken of by Brown as an embrocation in cases of rheumatism; and that similarly bruised and infused in the water, and given to poultry for drink, secures them against the yaws.

The whole plant, and especially the fruit, pounded and steeped in ponds, rivulets, or creeks, is employed in the same manner as the bark of the roots of the *Piscidia Erythrina*, for the capture of fish.

The seeds are applied to various ornamental purposes, as necklaces, buttons, &c. &c. ; in communities professing the creed of Rome, they are employed as beads for religious purposes when reciting the prescribed prayers of that church. The timber is said by Barham to possess little durability ; but on this point I am without any personal knowledge. In Nevis I was informed that the berries of the Sapindus Saponaria formed, at one time, a considerable article of export from that island, and entered into the composition of several quack medicines, but what these were I was unable to learn. It appears not improbable that their bitter qualities may have recommended them to the brewers as a cheap substitute for hops, and one somewhat less unpalatable than quassia.

In Dale's *Pharmacologia*, p. 304, I find a production of the West Indies noticed under the name of *Nux Virginiana*, which is evidently the nucleus of the fruit of some species of Spondias, of which two are indigenous, and to be met with in every island, namely, the Spondias mombin, or hog, and the S. myrobalanus, or Jamaica plum. A third species, the S. dulcis, with a fruit closely resembling the mango in size, colour, and form, brought originally from the South Sea Islands, is cultivated in Tobago, where alone I have met with it, and where its fruit is much prized under the name of the *golden*, or Tahiti apple. This fruit, which ripens in October, has a sweet and agreeable pulp inclosed in a strongly acid rind.

But it is the two species which grow spontaneously in the West Indies, which Dale has confounded under the common denomination of *Nux Virginiana*, and says, "*In Insula Barbados reperitur*," and gives the following account of it :

"Ossiculum nuclei Avellanæ magnitudine circiter et figurâ est, glabrum, colore fusco cum hilo prope alterum extremum, durum ossiculum continens nucleo intus albo, globulari, sapore amariusculo, eoque et odore aromatico. *Vires.* Obstructiones hepatis potenter reserat, totamque sanguinis massam

depurat, et scorbuticum, malumque habitum corporis emendat, volatilibus illis salibus vitalem hunc liquorem imprægnando, quæ eum evanidum et languescentem ad pruriorem, spirituosiorem statum restituunt, adeoque à fixatione eum præservant. Cutem etiam á maculis, aliisque impuritatibus liberat."—*Marl. Obs.*

And he describes the tree producing it as one "foliis laurinis, seu glabris et splendentibus; fructu parvo, turbinato, pulpam paucam continente," and adds, "à reliquis pruniferis differt."

This description, though vague and unsatisfactory, cannot be referred to any species which I have seen, except the S. Mombin, although from Lunan's account, *Hort. Jam.*, vol. ii., page 186, the S. Myrobalanus appears to possess more therapeutic activity; but it is probable that a correspondence of properties exists in both.

Barham, an authority not to be lightly contemned, says,

"In the year 1716, after a severe fever had left me, a violent inflammation, pain, and swelling, seized both my legs, with pitting like the dropsy. I used several things to no effect. A negro, going through the house when I was bathing them, said 'Massa, me can cure you,' which I desired he would; and immediately he brought me the bark of this tree with some of the leaves, and bid me bathe with that: I then made a bath of them, which made the water as red as claret, and very rough in taste: I kept my legs immersed in the bath as long as I could, covering them with a blanket, and then laid myself upon a couch and had them rubbed very well with warm napkins: I then covered them warm, and sweated very much: I soon found ease and fell asleep. On five and six times repeating this method I was perfectly recovered, and had the full strength and use of my legs."

Much of the efficacy of the practice is undoubtedly to be attributed to the heat and friction; but something must also be allowed for the stimulant and astringent qualities imparted by the bark to the bath. To local practitioners, Dr. Barham's experience furnishes some valuable suggestions.

Sloane commends the bark for its astringency, and recommends its use in decoction. The bark, on being wounded, yields a dark-brown gum, the properties of which have never been investigated.

The fruit of the *S. myrobalanus* is about the size, colour, and form of a magnum bonum plum, and is eaten with avidity by swine, whence its most frequent name of *hog plum;* but it is likewise known by the name of *gut plum*, from the localities in which it is most commonly found, in shady places, in guts or ravines. It is a tall handsome tree, flowering in March and April, and ripening its fruit in August; but neither its timber nor its fruit is held in any estimation. We learn from Dale that one or other of these species was supposed to yield the *gum anime* of the shops, but that is, I believe, the produce of a very different genus, the *Hymenæa Courbaril,* or locust tree, which I may notice at some future period.

14, *Octagon, Plymouth.*

LINIMENTUM SAPONIS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—There is an article in the last number of the Journal on the composition of soap liniment, and the changes that take place on mixing it with tincture of iodine. Your correspondent states, that he prepares his soap liniment strictly according to the Pharmacopœia, but he surely must alter the proportions there given, as the article made as the College directs is a *compact mass*, which it would be impossible to combine with tincture of iodine without the application of heat.

Such being the case, you will confer a favour on your brother-Chemists by publishing a formula for *linimentum saponis* that might be used in a liquid form, without differing materially from the Pharmacopœia.

I remain, Sir, your obedient Servant,

Inquisitor.

Brigton, Oct. 11h, 1847.

[The fact that *Soap Liniment*, when made strictly according to the instructions of the Pharmacopœia, frequently assumes the consistence of a jelly, has on several occasions been noticed in this Journal. It appears, however, that this does not necessarily and invariably occur, as the reduction of the strength of the spirit in the spirit of rosemary to a very small extent, prevents the gelatinization; and in distilling the spirit of rosemary, according to the directions of the Pharmacopœia, sufficient water sometimes passes over to effect this. A paper by the late Mr. Fisher of Bond Street, giving the results of some experiments on this subject, will be found in vol. ii., page 513 of this Journal. Mr. Fisher found that the presence of one-eighth part of water in the spirit prevented the gelatinization completely.]

DECOMPOSITION IN SOAP LINIMENT AND COMPOUND TINCTURE OF IODINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The perusal in your last Journal of that portion of Mr. Cooper's communication which relates to the liniment containing compound tincture of iodine and soap liniment, recalled to my mind a circumstance which came under my own observation, in connection with a prescription having the same composition and relative proportions as the one alluded to.

The prescription had been previously dispensed elsewhere, and whatever may have been the original colour of the liniment, the small portion which remained in the bottle differed but little from that of soap liniment alone. Perceiving that a separation of the oil had taken place, it was concluded that it had been liberated from the soap by the combination of the alkali to form a salt of iodine, the presence of such a salt having been previously indicated by the application of the usual tests for the purpose; and it then occurred as probable that the soap liniment had been made with a potash soap.

A small portion of the liniment recently made, and quite dark in colour, was put aside, and in the course of ten days or a fortnight, the colour of the iodine had disappeared, owing, I presume, to the formation of iodate of soda, and, probably, iodide of sodium.

From the character of the liniment, and the quantity that was ordered, I think it very likely that in this instance, a change, similar to that I have above indicated, had taken place in the portion remaining in the bottle which was brought to me.

The occasional occurrence of these "peculiarities in prescriptions," suggests the propriety of exercising considerable caution in giving expression to an opinion which may affect the reputation of the previous dispenser.

I remain, yours truly,

THOMAS GREENISH.

20, *New Street, Dorset Square, Oct.* 1847.

ON THE PURIFICATION OF SULPHURIC ACID,

AND THE DISTILLATION OF LIQUIDS IN GENERAL.

BY M. LEMBERT.

SULPHURIC acid is, of all the re-agents, the one most frequently employed in the laboratory, and yet it is but seldom found in a state of purity. This arises from the difficulty and even danger that attends its purification, especially if a large quantity be operated on. As met with in commerce, it is generally very impure, and it is difficult to distil a few pounds, or even a smaller quantity of it, without the retort being broken by the bumping which arises from the vapour being formed with less facility in vessels having a smooth surface, from the density and consistence of the liquid, or from the high temperature at which it enters into ebullition, as well as from the liquid being a bad conductor of heat. It has been proposed to introduce into the retort pieces of glass, strips of platinum, &c. Some have recommended to apply the heat only to the upper part of the liquid, but these methods I find by experience do not accomplish the object desired. I have endeavoured to discover some plan capable of facilitating the formation and the disengagement of the vapour, and the following I find to succeed the best :—

1. I introduce into the retort some pieces of *Quarzite*, a variety of granulated quartz, resulting from the conglomeration of particles of that substance, probably under the influence of a high temperature. It is important to choose this variety, the others giving far less satisfactory results. The shape of the pieces is by no means a matter of indifference, with reference to the success of the process. I have remarked in a great number of distillations, that the fragments obtained by striking on the edge of a former cleavage, facilitates the distillation better than very thick pieces. The number as well as the size of the pieces, must also be observed. If they are too small, and in too small a quantity, the bumping may occur, because the fragments are easily lifted by the vapour which is disengaged, consequently, the bottom of the retort being no longer covered with the siliceous substance, assumes the condition of a smooth vessel, and the vapour is produced with difficulty. If they be small, and in too great quantity, the ebullition is irregular, bumping occurs without ebullition, bursts of vapour take place at intervals, the liquid rises in the retort, and if the latter be rather full, it may pass over into the neck. The fragments should be at least a *centimetre* (one-third of an inch) in length, for the operation to succeed well. I use them generally as large as the neck of the retort will allow. Ten or twelve scales of *quarzite* of this size are sufficient to distil readily several pounds of acid. It is well to cover the retort, that is to say, to distil in a reverberatory furnace, furnished with a dome; without this precaution, the distillation would proceed very slowly, although the ebullition might be very brisk, because the vapour of

sulphuric acid being very heavy, and only existing at a high temperature, would condense before reaching the neck of the retort.

This process, which is very simple, is especially advantageous, since it may be applied to the distillation of many other liquids. In fact, the substance employed to facilitate the ebullition, is unalterable by nearly all chemical agents, and for the last three or four years, since I have discovered it, I have employed it in nearly all my distillations.

2. In the process just described, the quarzite acts by its numerous rough surfaces in facilitating the formation of the vapour; but theory shows that the same result might be obtained, that is, the distillation without bumping, if the acid could be made a good, or at least a better conductor of heat; and this point I think may thus be arrived at :—

Sulphate of potash, and dry sulphate of soda dissolve readily in sulphuric acid, especially when aided by a gentle heat. This solution appears to conduct heat very well, and boils without bumping, provided there be not too great a quantity of sulphuric acid in proportion to the sulphate. I proceed thus :—I put into a retort the sulphuric acid which I wish to distil, and add to it from 150 to 200 grammes of sulphate of potash or soda for every killogramme of acid (from two to three ounces to the pound avoirdupois) and then distil as already stated. I collect two-thirds or three-fourths at most of the acid, and if I wish more, I add fresh acid, and recommence the distillation. When the process is terminated, I allow the retort to cool, and stop it up to be kept for subsequent use. I have said that I do not collect more than three-fourths of the acid originally put into the retort, and for these reasons :—In the first place, the mixture boils at a higher temperature than the boiling-point of sulphuric acid, and the temperature rises in proportion as the solution becomes more concentrated. If it be concentrated too much, that is, if too much acid be distilled off, there would soon remain little more than the bisulphate, and, under these circumstances, the glass would be softened. The softening of the glass occurs even at an earlier stage of the process than this. In the second place, this solution of sulphate, or rather of bisulphate of potash in sulphuric acid, becomes less fusible in proportion as it contains less acid, and when the retort is to be again used, the risk of breaking it is incurred in effecting the fusion of the solid mass.

3. Of these two processes, I prefer the first; and although it may be sufficiently efficacious, since those to whom I have shown it, and who have practised it, have been astonished at the facility with which the acid distils by this method, yet the process may be rendered more easy still by combining the two, that is to say, by putting into the cucurbit, both the sulphate and the *quarzite*. Then, except the elevation of temperature, the sulphuric acid boils as easily, and with as much regularity, as water.

It is well not to distil the sulphuric acid too many times on the same *quarzite*, for the rough edges are blunted, a very fine powder is separated which floats in the liquid, and after the lapse of a certain time, it no longer produces the same effect. Then, if the latter method be adopted, we must not wait until the residue of the distillation is quite cold before adding fresh acid, because the pieces of *quarzite* which would remain in the solid mass could not be changed. To effect this, it is necessary to add the acid before the refrigeration is complete, to decant the liquid, take out the quarzite, and return the solution into the retort, in readiness for another operation, after having added to it some fresh pieces of the substance mentioned. The retort also should not be too full, and should be placed, if possible, in such a position, that the first part of the neck may incline towards the body of the retort.

The reason of this, which is an observation applicable to the distillation of liquids generally, is, that when a liquid is in a state of ebullition, if it be

looked at horizontally at the level of the surface, small drops are sometimes seen projected above the surface, forming curves of greater or less extension. All liquids, in boiling, do not exhibit this phenomenon; but as sulphuric acid does, it follows, consequently, that during the operation, and especially if the retort be too full, a great number of these drops are thrown into that part of the neck which is near the body of the cucurbit. This part of the neck should, therefore, be inclined in such a manner, as to favour the return of these drops into the cucurbit, which, without this precaution, would run over, and mixing with the distilled liquid, render it impure. Currents of cold air, also, cannot be too much guarded against, which otherwise striking against the neck of the retort, would be likely to cause a fracture. Every time that my retorts have been broken in distilling sulphuric acid, the accident has happened in this way.—*Journal de Pharmacie.*

ON THE PREPARATION OF THE EXTRACT OF WHITE POPPIES.

BY M. BLONDEAU.

In the month of July, 1846, M. Molyn, Pharmacien at Antwerp, inserted in the *Journal de Chemie Medicalé*, a paper on the preparation of the extract of white poppies, intended for the manufacture of the syrup. After having obtained the extract from the poppy heads, by means of cold water, M. Molyn proposes to dissolve this extract in a small quantity of alcohol at 40°, in order to precipitate from it the salts and mucilaginous matter, to filter the liquid, and to add to it immediately some syrup that has been evaporated to a proper consistence.

M. Lepage, Pharmacien at Gisors, having called the attention of the Society to this paper, M. Gobley, to whom it had been sent, gave at the meeting in April his opinion on the process of M. Molyn, and his conclusions are that it should not be substituted for the process in the Codex, which decidedly gives far preferable results.

I have not read the letter of M. Lepage, and I think that his opinion is in accordance with that of M. Gobley; but as I think that our honourable member has not rendered sufficiently evident the superiority of the process of the Codex, and the inconveniences attending that of M. Molyn, I imagined that the society would perhaps allow me to direct its attention again to a preparation so frequently employed in medical prescriptions. M. Molyn, as M. Gobley has well observed, does not appear to regard as indispensable the use of distilled water for the preparation of the aqueous extract, and submits it to the action of alcohol at 40°: when prepared with common water, it contains, besides mucilaginous matter, a very large proportion of calcareous salts. It appeared to me, that in the employment of almost absolute alcohol there was this serious inconvenience, that if it precipitated the calcareous salts, it only dissolved the portion of extracto-resinous matter soluble in water by the help of other principles, and that only a small proportion of extract was obtained, perhaps not possessing some of the sedative properties of the extract in the Codex. In showing the results obtained by different modes of proceeding, we shall see that the hydro-alcoholic extract is the only one which should be admitted in our officinal preparations; but there would be, perhaps, an advantage in employing the process of M. Molyn, in substituting alcohol at 21° for that at 40°, which yields a product inferior in quantity and quality.

No. 1.—*Extract prepared according to the directions of the Codex.*

125 parts of poppy capsules gave 18.50 of an extract of good consistence, and an equally natural taste and odour.

No. 2.—*Aqueous extract treated with alcohol at* 21°.

255 parts of poppy capsules in coarse powder yielded, after two macerations, 60 parts of extract of good consistence, with a smell and taste slightly *vireuse*.

30 parts of this extract mixed with distilled water to a syruppy consistence, when treated with alcohol at 21° yielded, after filtration, 19 parts of an extract similar to that of the Codex, but, however, of a deeper colour.

No. 3.—*Aqueous extract treated wth alcohol at* 40°.

A similar quantity (30 parts) of the aqueous extract No. 2, was treated, like the preceding, with alcohol at 40°, as M. Molyn advises. An elastic magma was at first formed, which rendered the division of the extract very difficult; the alcohol was rather charged, and after filtration, 9.30 parts of an extract were obtained, having a good consistence and a glossy appearance, but not possessing the odour of the preceding, and leaving in the throat a sensation of acridity, slight it is true, but rather persistent. Thus then, by this process, less than half the amount of extract is obtained, and the product is much inferior to that obtained, either directly by alcohol at 21°, or by submitting the aqueous extract prepared with distilled water to the alcoholic menstruum. To conclude these remarks, to which I do not pretend to attach more importance than they deserve, I prepared a syrup of white poppies with each of these extracts; and I think, in a Pharmaceutical point of view, that the preference must be given to the one prepared with the aqueous extract, treated with alcohol at 21°. Its colour is deeper, which seems to indicate that there is a greater quantity of extractive matter in it—its taste is more natural than that of the other two, and epecially than that of the syrup prepared by M. Molyn's process, which possesses a little of that slightly acrid flavour that I have already mentioned in the extract obtained with alcohol at 40°.—*Journal de Pharmacie*

BLISTERING CLOTH.

BY M. GAROSTE.

℞ Black pitch, purified, 125 parts.
White wax, 30 parts.
Cantharides in fine powder, 60 parts.
Essence of turpentine, 15 parts.
Olive oil, 8 parts.

The pitch is purified by melting it in a dish, and straining it through a close piece of linen,

The pitch, thus purified, is melted in an earthen vessel over a gentle fire, with the wax; the cantharides, the oil, and the essence of turpentine are then added; when the mixture is well stirred, a small quantity of the plaster is thrown into cold water and kneaded; if it be neither too soft nor too brittle, it is then spread on the glazed side of some oil-cloth with a plaster-iron slightly heated.

The quantity of wax, oil, and essence, may be varied according to the quality of black pitch employed, so as to give the plaster a consistence suitable for its being spread on cloth. Copper vessels should never be used for preparing those medicinal compounds of which wax is an ingredient; the plaster should be melted in a glazed earthen vessel. The cantharides are added by means of a sieve, so as to divide the particles, and prevent their collecting into lumps. It is convenient in sending out the blistering-cloth, to cut a piece of oiled paper of the same size, and lay this over the surface of the plaster, to prevent its adhering to the envelope.

These vesicatories should never be camphorated with a solution of cam-

phorated ether, but rather with camphor finely pulverized, and for this purpose the blistering-cloth should previously be slightly warmed.

Of all the formulæ published for blistering-plaster, there are none, in my opinion, more easy in application, and that will keep in a better state of preservation than this.—*Journal de Pharmacie.*

THE CHOLERA.

LETTER FROM MR. HERAPATH.

Sir,—The steady advance of the cholera westward appears to have called public attention to its probable re-appearance in England before long, and a paragraph in one of the London papers of Friday, leads me to believe that the majority of persons will depend for protection upon any preparation which is advertised as a "disinfectant," erroneously believing that all disinfectants have the same power over the virus which creates disease, as they have over unpleasant smells. Allow me to correct this error by detailing the results of my experience during the visitation of this horrible malady in 1832, when, as a Chemist, I laid myself out for a close examination into the cause, mode of propagation, and check for it. For this purpose, I obtained information of, and visited in person all the earliest cases which showed themselves in this city generally, and in each great and public establishment in particular. For some time I attended almost daily at the cholera hospitals, and experimented in every way I could think of, upon the dead and living subjects, their contents and *ejecta*, the atmosphere surrounding them, and their articles of clothing. The conclusions I arrived at I forward for the information of those who have not had the same opportunities :

1. That the cause of cholera is a putrid animal poison, capable of being recognised by the smell by some, emanating from, and surrounding the dead or living cholera-subject or articles of clothing.

2. That it is not sulphuretted hydrogen or hydro-sulphuret of ammonia, as it does not decompose salts of lead or zinc, and when passed through nitrate of silver, it only forms a red solution when exposed to light.

3. That it is only received into the living body through the lungs, and cannot be propagated by innoculation.

4. That infection can be conveyed by articles of clothing, bedding, &c., and that washerwomen are more subject to infection than ordinary persons from that cause.

5. That all persons are not equally liable to infection from equal exposure, and even the same individual becomes more sensitive under certain circumstances.

6. That the poison is destroyed by chlorine gas and a heat of 300° Fahr.

As the object of the present communication is merely to give the public opinion a right direction, so as to help the future boards of health to combat this insidious and powerful enemy, I must at once state that the two most popular disinfectants of the day—the chloride of zinc and the nitrate of lead, known as Sir W. Burnet's and Ledoyen's, will be of no avail, although they will promptly remove ordinary putrid effluvia. The only chemical preventive I depended upon in my numerous exposures to the virus, was chlorine gas, and this I believe to be a perfect one if the fumigation is complete. I invariably passed through an atmosphere of it on my return home, and kept it escaping in my residence during the continuance of the disease in the city. I also placed large quantities of the substance necessary for the evolution of this gas, in the hands of a Bristol Druggist, who was kind enough to distribute 1,200 quantities of it gratuitously to applicants during three days, with instructions for the use, and am happy to say that during that time the deaths

fell from ten to one per day, and I have but little doubt that if every ship arriving in England from an infected place, should be exposed to a perfect fumigation with chlorine, we shall be preserved from the infection. If the disease should pass this cordon, by any accident, then every house in the infected district should be simultaneously fumigated with it—say three times a day ; unless done in all houses at the same time, it would be useless, or nearly so, and to do it effectually, a mixture of three parts of common salt and one of black oxide of manganese, should be placed just inside the outer or street-door of the dwelling-house, and a little common vitriol poured upon it. The inward current of air will convey the chlorine gas to every part of the interior, and wherever it can be smelt the effect is produced—the miasm is destroyed. If articles of clothing are infected, and the colours likely to be injured by the gas, they may be heated in an oven or on a kiln to 250 or 300 degrees (about the heat of baking bread), when they might be handled or used with perfect impunity.—*Times.*

Bristol, October 11.

[This letter cannot have failed to attract much public attention, the subject being one on which considerable anxiety is felt, and the well-known character of the writer, as a scientific man, such as to give some authority to his statements. We must confess, however, that the representations made, and the evidence adduced or alluded to by Mr. Herapath, do not appear to us sufficient to justify the confident tone in which he recommends the use of chlorine as a certain and effectual means of destroying the contagion of cholera. The conclusions, founded on experiment, to which he says he has arrived, involve points of very great importance, and if the experiments really justify the conclusions, they ought forthwith to be published in detail, so that medical and other scientific men may be enabled further to test them, or at least to form an opinion as to the degree of importance which ought to be attached to them.

When a scientific man speaks of *the cause of cholera* being recognisable by the smell—not decomposing salts of lead or zinc—forming a red solution with nitrate of silver when exposed to the light—only received into the living body through the lungs, and not propagated by innoculation, &c.—it will naturally be asked, what are the means which have been adopted for submitting the poison to these tests, and what the evidence that the matter thus tested was truly the cause of cholera.

Mr. Herapath is not the only scientific man who has been engaged in this investigation, nor has he alone tried the use of chlorine as a means of destroying the contagion ; no disinfectant has been more extensively used in cases of cholera than chlorine, yet there is no satisfactory evidence in favour of its efficacy. Some have even gone so far as to assert that it is injurious. Dr. Albers, in the *Medical Gazette*, vol. viii., p. 410, states, that " at the time that the Cholera Hospital (at Moscow) was filled with clouds of chlorine, then it was that the greatest number of the attendants were attacked." Yet Mr. Herapath asserts that " wherever it (chlorine) can be smelt the effect is produced—the miasm is destroyed." This assertion, unsupported by evidence, cannot stand against the statement of Dr. Albers.

But many of the public will no doubt be satisfied with Mr. Herapath's statements, and will be ready, on his recommendation, to apply the simple

means of preservation which he indicates. The Druggists may safely calculate, therefore, on some demand for black oxide of manganese and oil of vitriol, and we are anxious to impress upon our readers the importance and necessity of apprising all persons to whom these ingredients are sold, of the serious and even fatal consequences which may result from the incautious use of these fumigations by persons unaccustomed to such manipulations.—Ed. *Pharm. Journ.*]

ON THE GENERAL LAWS OF THE CONSTITUTION OF RESINS.

BY DR. WILHELM HELDT.

When we consider the facility with which different resins absorb and evolve oxygen and hydrogen, whilst being dried at a temperature of 212° Fahr., as well as the difficulty of procuring them in a chemically pure state, it is obvious that an accurate determination of their real composition is scarcely to be attained. Furthermore, when we bear in mind that by the use of solvents, such as alcohol, employed for the separation of the resins, a change is easily effected in them, either by the absorption of oxygen, as H. Rose has observed, in sylvic acid, or by partial combination with the spirit of wine, as has already been proved in a substance nearly related to the resins, viz., lecanoric acid, we can place but little reliance upon the formulæ calculated from analyses, as the resins may have undergone one of the changes here mentioned.

The general laws, therefore, for the formation of the resins, may be considered to be as follows :—

1. One group of resins is formed by the abstraction of a certain number of equivalents of hydrogen in the form of water, from the composition of the respective oils, and the substitution of an equal number of equivalents of oxygen.

The substances formed according to this law, are, therefore, simple products of the decomposition of the volatile oils, and are produced in the same manner as anhydrous acetic acid is procured from alcohol.

In this manner are formed the *epsilon copal resin*, *resin of Ceradia furcata*, *helenin*, *alpha resin of Styrax Benzoin*, *santonin*, *eugenin*, *gamboge resin*, *cubebin*, *phlobaphen*, *anemonin*, *asaron*, *soft resin of myrrh*, and *chrysophanic acid*.

Some of these substances combine with bases, without expelling the elements of water from their composition, others possess no affinity whatever for bases. They are all soluble in water. *Asaron*, *helenin*, *santonin*, and *anemonin*, are perfectly or partially volatile, as is also *chrysophanic acid*.

Clove acid, *cinnamic acid*, and *benzoic acid*, are formed, according to the same law, from their respective volatile oils, but their nature is quite different from that of resins, as the product of decomposition formed out of the volatile oil absorbs one equivalent of water, which can be replaced by bases.

2. A second group of resins originates according to law 1, but with the absorption at the same time, of the elements of water into the product of decomposition of the volatile oil. Hereto belong *styracin*, *easily soluble euphorbium resin*, *anime*, *crythroretin (red resin of rhubarb) mastic*, *amber*, *pasto resin*, *cerin*, *lactucon*, *caryophyllin*, *elemi resin*, *cow-tree resin*, and *aloetin*.

These resins are mostly indifferent, and dissolve in alcohol and ether. The anime is believed to have an acid reaction.

3. The third group is formed according to law 1, oxygen being absorbed into the product of the decomposition of the oil. They are, therefore, pure oxides of this product.

This group includes *copaiva resin*, *sylvic acid*, *pimaric acid*, *the resin of Pinus Abies* (Johnston), *oxysylvic acid*, *betulin*, *plantanin resin*, *parietin*, *athamantin*, *difficultly soluble euphorbium resin*, *myrrhin*, *the alpha*, *beta*, *and gamma resins of copal*, and *dammar resin*.

The greater part of them combine with bases without evolving water from their composition, and their affinity for this is the greater, the more oxygen they contain. Their solubility in alcohol and ether increases also in the same proportion, as the quantity of oxygen increases, whilst their fusing point diminishes in the same proportion.

4. The fourth group is formed according to law 3, with the simultaneous absorption of water into the product of oxidation. To this group belong the *remaining resins of Coniferæ, phœoretin (brown resin of rhubarb) aporetin, jalap resin* (rhodeoretin)? The absorbed water is not evolved during their combination with bases.

5. Lastly resins are formed by the absorption of water into the composition of the volatile oils. In this way are formed *soft resin of elemi, resin of balsam of Peru, brean,* and *icican.*

Fremy found that the longer the balsam of Peru had been exposed to the atmosphere, the greater was the quantity of water. It would be of great importance for the verification of these laws, if it were possible to produce these resins artificially from those volatile oils with which they are contained in the same plant. For this purpose I have made a large number of experiments, but hitherto without success.

I have chiefly endeavoured to produce crystallized sylvic acid, santonin, asaron, and crystallized elemi resin respectively from oil of turpentine, oil of santonin seeds, oil of asarum, and oil of elemi.

I first exposed the various oils, spread in thin layers, for six months to the influence of the oxygen of the atmosphere. Other portions I treated with greater and smaller quantities of nitric acid and hydrated chromic acid of different degrees of concentration, and placed the mixture also for six months in a place where they were for the greatest part of the day exposed to the influence of the sun. Still I did not succeed in producing even one of the above-mentioned substances.

The substances which I obtained by distillation, or by treating them with alcohol and ether, were incapable of being crystallised, and possessed qualities which were quite different from those of the substances mentioned.

We may, however, hope that methods of obtaining them from the volatile oils will be discovered.

It might be objected against the above-mentioned laws, that it is not at all proved that the resins owe their formation to those oils, which are, in common with them, contained in the same plant, and the well-known fact, that volatile oils are changed into resins by exposure to the atmosphere, does not justify this supposition, as it is possible that both oil and resin may be simultaneously formed by the vital process as products of decomposition of some principal constituent of the plants, and may, therefore, be similarly composed.

To this we may answer, that even if we should not succeed in forming these bodies artificially, we may still maintain that the supposed origin is correct, as it exists in such a large number of substances, after the most simple rules, and the objection of an accidental coincidence is entirely removed by the great number of analogies. Also, the gradual separation of crystallised substances out of the volatile oils, when these are left for some time to themselves, shows distinctly enough that perfectly similar processes are taking place after the separation of the volatile oil from the plant, since the stearoptene are mostly hydrurets or oxydes of the volatile oils, and as it can hardly be doubted that these substances owe their origin partly to a metamorphosis of the oils.

It appears as if stearoptene formed an intermediate substance between the oils and resins, and as if the manner of their formation coincided even in some cases (as law 5 shows) with that of the resins.—*Ann. der Chemie,* Bd. lxiii.

SUGGESTIONS
IN REFERENCE TO THE PHARMACEUTICAL BILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Believing that the time is not far distant when the Members of the Pharmaceutical Society will be called upon to use their individual and collective influence for the purpose of procuring a Pharmaceutical Bill, and being an old member of that body, I would hope that I am not unworthily or needlessly trespassing upon your attention in offering a few suggestions, which, if they happen not to be in unison with the sentiments of *all* my brother-Members, nevertheless, are the candid results of calm and dispassionate reflection, and elements, in my humble opinion, which will, in no small degree, advance or retard the success of any measures attempted to be secured for the protection and advancement of the Chemists in this country.

In your general observations, on various occasions, upon the merits of the Pharmaceutical Bill proposed in May last, I have noticed your anxious desire fully to explain the general bearings of this important scheme; and after the candid manner in which you have solicited the opinions and sentiments of the Members upon the practicability of the measures in question, in your number of September last, I would respectfully, by your permission, draw the attention of the Members of the Pharmaceutical Society to that part of the Bill which more immediately affects Assistants and Apprentices.

If I properly understand the provisions of the Bill, I opine that all Assistants and Apprentices who may not have been associated with the Pharmaceutical Society previous to February, 1843, must pass the examination prescribed, or be subject to the penalties of the Act? Now, Mr. Editor, I would be willing to admit with you, that the claim which exists now for exemption by the junior Druggists, will exist at the expiration of another six years, *if the whole of the Chemists were Members of the Pharmaceutical Society;* but when we recollect that not one-half of the present Chemists of this country are associated with that Society, and hundreds have, perhaps, barely heard of its existence and importance, and, consequently, are unprepared for its proposed restrictions, I would hope that this fact alone will be the means of drawing the attention of the Council to the injustice which would be inflicted upon a great number of highly respectable and rising young Chemists, who may be ignorant of their responsibilities and obligations, and never have had the opportunities of acquiring that scientific education which the nature of the examination will subject them to. Had the Pharmaceutical Society procured a Bill at the commencement of its career, then the after Assistants and Apprentices (*which are the same individuals we have now to deal with*) must necessarily have prepared for the imposed examination; but six years have now elapsed since the Society came into existence, and many of *those Apprentices* have become Assistants—many of *those Assistants* (though not Members of the Society) have commenced business on their own account, yet the provisions of this Bill would subject *all those who may not have had the pecuniary means or inclination to commence business,* to the expense and loss of time attendant upon studying and passing the examination, when their fellow-Apprentices, *already more fortunately established in business,* (though not half so well qualified, perhaps, in mental capacity), would escape the dreaded ordeal, and be duly registered under the Act, as properly qualified Chemists.

I would sincerely hope that the manifest injustice of this part of the Bill will claim the consideration of the Council, and bear considerable modifications before it is converted into law, for its attempted enforcement

upon the junior branches of the trade will, I fear, create a formidable array of opposition to its enactment, and tend to widen the breach which already exists upon this nice and important subject.

It may be thought that those who have employed their time properly during their apprenticeship need not fear the examination ; but how many scores of youths are there in the trade in the country who never have had, nor can have, the opportunity, until matters are altered, of properly employing their time for examination, or, even had they the time, there is an absence of that important knowledge in their masters which should constitute the foundation of their Pharmaceutical education. If it was considered unjust to oblige those who had been some time in business to come forward and test their qualifications before a Board of Examiners, when the Society was first established, the same reasons, I contend, exist now with those Assistants and Apprentices who have served a considerable portion of their term.

For so many Druggists have commenced business during the last four or five years, *without having any connection with the Pharmaceutical Society*, and they must necessarily have amongst them great numbers of Assistants and Apprentices who are, in conjunction with their masters, ignorant of the advantages, and, perhaps, totally unacquainted with the present operations of the Society, that it becomes, in my opinion, a question of grave consideration whether much unnecessary injustice, annoyance, and expense would not be imposed upon this class of junior Druggists, who may fairly claim exemption under the same plea which existed at the commencement of the Association. It may be said, that if you once admit this principle, the claims for exemption will never cease ; but this might be met by allowing all Assistants and Apprentices to be registered and exempt who had served two or three years of their time—presuming that their partial acquaintance with the trade entitled them to be considered Chemists and Druggists—by subjecting them to a registration fee of one guinea, obliging them to become Associates to the Society, by which they would be fully acquainted with its importance and proceedings, and allowing one month only for registration.

You are doubtless aware, Mr. Editor, that the Members of the Pharmaceutical Society, as a body of Chemists, are in a large minority, and that it will be advisable for this minority to make moderate and liberal concessions to the majority, in order to obtain their cordial co-operation. The metropolis may have a majority of Pharmaceutists, but it only numbers about 400 Members, and as the strength of the Pharmaceutical Society lies amongst the country Members, it will be found expedient to canvass their opinions, and have their decision previous to any ultra-measures being adopted. For it must be borne in mind that a large majority of Chemists in this country, not connected with the Pharmaceutical Society, have Apprentices, whom in honour and strict justice they are bound to instruct in the trade or calling of a Chemist and Druggist, and it can hardly be presumed that these masters will (after pledging themselves, in their indentures, to fit their youths for the practice and proficiency of a Chemist and Druggist according to *its present accepted qualifications*) allow any enactments to be secured which shall condemn their Assistants and Apprentices as unfit and unqualified for their calling, and the objects for which they were indentured, expose them to the odium of their friends as having imposed upon their good intentions and prospects, and subjecting their connexions to unlooked-for and additional expense, risk, and loss of time, occasioned by a course of study in London, necessary for the examination.

Should the Pharmaceutical Council deem it advisable to proceed with the Bill without making some modifications, as regards the exemption of

Assistants and senior Apprentices, the consequence will be that a large and powerful spirit of opposition will be created to resist its enactments, and that hundreds of Assistants will rashly rush into business, in order to be registered under its provisions, thus inundating, unnecessarily, the trade with new beginners, for no apparent purpose but reckless competition and ultimate ruin.

As the time draws near for the meeting of Parliament, I would recommend the Pharmaceutical Council liberally to distribute copies of the intended Bill to every Druggist in the kingdom, to urge upon the local Secretaries the necessity of *convening a meeting of all the established* Druggists, and to examine and discuss the merits and adaptation of the Bill, and then the Society will have a proper foundation to go upon, and fairly merit and secure the co-operation of the majority of the trade.

The adoption of this, or a similar course, would necessarily impose a considerable expense upon the Council of the Society, but rather than this fair and impartial course should be neglected on the score of expense, in order to enable every Druggist to express his opinion upon this truly important subject, I would suggest the propriety of opening a subscription amongst the trade for that purpose, and I, for one, shall have much pleasure in subscribing my guinea for such a desirable object.

I am, yours respectfully,

Dudley, Oct. 6, 1847. C. F. G. Clark, M.P.S.

[The suggestions contained in the above letter are quite worthy of consideration. The more important of them were maturely considered by the Council at the time the draft of a Bill was prepared, and a proviso was inserted in the clause relating to the examination, giving power to the Council, at any time within six years from the passing of the Act, to make a bye-law in favour of those who, at the time of the passing of the Act, "shall be serving, or shall have served, their apprenticeship to any Chemist," &c. &c. If it be considered that this clause is not sufficiently explicit, it would be easy to embody the proposed bye-law in the Act. The Act itself was purposely made as simple as possible, as the Council were aware that every debateable point needlessly introduced might give rise to differences of opinion, and considered it better to confine the Act itself to the establishment of an efficient system of self-government, including education and examination, and leaving the details to be carried out by the body constituted for this purpose. This question may be re-considered.

There is one argument of our correspondent, the force of which does not appear to us to be obvious. He observes that there are probably hundreds of Chemists who have never heard of the existence or importance of the Society, and infers, that, on this account, the same general exemption from examination which was granted in the first instance, should be repeated in reference to the proposed Act. We have no idea where these hundreds of Chemists can be; for circulars have been sent, on several occasions, to every city, town, and village in the kingdom, and to every individual whose name could be obtained. The travellers from the wholesale houses are also in communication with all the retail Chemists in the kingdom, and the Society has been advertised, during six years, in the public papers in town and country. If the plea of ignorance be tenable under such circumstances, the same plea might be urged after the passing of the Act by persons alleging that they had never heard of it. With the exemption above alluded to, either in the Act itself, or in a bye-law, we think the rising generation have no cause for alarm on the subject.—Ed.]

THE OBSTACLES TO THE ATTENDANCE OF LECTURES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Many an article has appeared in the Journal respecting the Lectures of the Pharmaceutical Society and their attendance, and not unfrequently the Associates have been charged with apathy because there has not been a larger attendance at them. Now, the importance of such an attendance cannot be too strongly urged, and if an indifferent person were to read the remarks frequently made upon the subject, he might think that the principals were anxious for the intellectual improvement of their Assistants, while the young men themselves were quite indifferent to the matter, preferring a "blissful ignorance" to a little application that would result in great benefit to themselves in after life. But, is this a just view of the case? I for one well know that the very opposite is the truth in many instances. I know one Member who has more than one Assistant, and yet has objected to their attending the lectures. I know two others who were once Members of the Council, if they are not now (and one would naturally suppose that they would be more alive to the importance of it than the Members at large), and yet neither of them allow their respective Assistants to go to the lectures. These, I fear, are not isolated cases, and if so, can we wonder at a thin attendance?

It is very praiseworthy for lecture-rooms and lecturers to be provided; but as long as the Assistant is prevented from attending them, it is the same to him as if there were none. It is not unlike holding out food to a starving man, who is fastened in a cage and cannot get at it. I submit, that Chemists generally would lose nothing, but rather be the gainers, by allowing their Assistants to attend the lectures; they would render them more competent, as well as grateful—a feeling of interest would be excited which would probably attach them to their employers' welfare—and the result would be mutual advantage.

Apologising for trespassing so long upon your time,

I remain, Sir, yours most respectfully,

London, Oct. 22, 1847. W. H. B.

[In publishing this letter we think it right to observe, that although we agree generally in the sentiments of the author (who has given his name), we disclaim any desire to interfere with the domestic arrangements of individuals, and we have omitted one clause in the letter which might have been considered rather dictatorial. Every man has an undoubted right to maintain and express his own opinions. Those who think they are sufferers by allowing their Assistants to attend lectures, are therefore quite at liberty to express that opinion, and to act upon it: on the same principle we are at liberty to express our opinion on the subject, which is, that they are under a mistake.—Ed.]

THE SILVERSMITHS' LICENCE.

Some of our Members have been threatened with informations for selling smelling bottles with silver caps, without possessing the silversmiths' licence. We have made inquiry at Somerset House, and insert the following extract from the 43rd George III. cap. 69, which gives the needful information respecting the state of the law on this subject:—

"Every person trading in, vending, or selling, any gold or silver plate, or any goods or wares, in which any quantity of gold exceeding two

pennyweights, and under two ounces in weight, or any quantity of silver exceeding five pennyweights in weight, and under thirty ounces in weight, in any one ware or piece of goods, is or shall be manufactured, (shall pay) for every such licence £2 6s."

As the silver caps of smelling-bottles seldom if ever amount to five pennyweights in weight, it is clear that Chemists need not be under any apprehension: but so long as excise laws are in force, informers will be on the look out; and as these persons often officiously exceed their duty, by endeavouring to overstrain the meaning of the law under which they flourish, it is necessary to be prepared to rebut any unjust charge from such a quarter. We take this opportunity of observing, that, in the event of any prosecution or extortion being attempted by persons of this class, we invite any Chemists who may be so attacked to give us immediate information, in which case we are at all times ready to make application at head quarters for protection.

The various laws relating to the spirit licence, the excise acts, and the measure stamp duty, have been at various times published in this Journal, in order to enable our readers to avoid any inadvertent infraction of the law. In any case of injustice or persecution, on the part of subordinate officers, it is only necessary to make a fair statement of the facts to the proper authorities, as there is no disposition, either at Somerset House or at the Excise Office, to countenance proceedings of this kind when no violation of the law has been intended.

NOTICES OF BOOKS RECEIVED.

LECTURES ON THE PHYSICAL PHENOMENA OF LIVING BEINGS. By CARLO MATTEUCCI, Professor in the University of Pisa. Translated under the superintendence of Dr. PEREIRA, F.R.S., &c., &c. London: Longman and Co. Small 8vo, pp. 435.

THE original of this work has enjoyed considerable celebrity on the continent, two editions having been published in Italy, and one in France. The present edition is a translation of a French copy, with numerous corrections and additions by Professor Matteucci. The work must not be taken as a complete treatise on physiology, some branches of the subject being discussed more at length than others. Its chief value consists in the elucidation which it affords of the peculiar views of the author, some of which are highly important as well as original.

Among the physical phenomena treated of, we may mention molecular and capillary attraction, endosmose, exosmose, absorption, digestion, respiration, electricity, and phosphorescence in animals, nervous force, muscular contraction, the circulation of the blood, &c.

As a specimen of this interesting and valuable work, we give the following extract on endosmose, which contains an allusion to the respective actions of purgatives and morphia on the intestines:—

"*Endosmose of Cells.*—A cell is the elementary organ of all animal and vegetable tissues, and cell-life involves an act of endosmose: this shows how much the phenomenon of endosmose requires to be more completely studied, in order that we may be enabled to make of it all the applications of which it is susceptible.

"*Endosmotic Action of Purgatives.*—I cannot conclude this lecture without referring to the recent experiments of Poiseuille, made with the view of explaining by endosmose the purgative action of certain substances. He found that there was endosmose through animal tissues from the serum of the blood to Seidlitz water, and to solutions of sulphate of soda and common salt. Now this is precisely what happens when we use these medicines internally: the rejected excrements contain an abundant quantity of albumen. In this case we must admit that endosmose takes place through the capillary vessels of the intestine, from the serum of the blood to the saline solution introduced into the alimentary canal.

"*Endosmose of Liquids in Motion.*—But to remove all doubt of the propriety of Poiseuille's applications of this fact, it was necessary to demonstrate that endosmose takes place when one of the liquids is in motion, and is being continually renewed. This has been recently done by Dr. Bacchetti, who has shown that the rapidity of endosmose is considerably augmented when one of the liquids was continually renewed. This result, moreover, is in accordance with the principles of the theory of endosmose: the interchange of liquids constantly going on through the membrane, leads to the suspension of the action of endosmose; or, in other words, the conditions for the production of the phenomenon are so much the better preserved, as the liquids remain longer without mixing. Poiseuille has also shown that endosmose ceases to take place in a membrane after a certain time of action, but that the membrane re-acquires this property by submitting it to the action of other liquids.

"*Remarkable Influence of Morphia.*—The most remarkable fact discovered by Poiseuille, is, that of the influence exercised by hydrochlorate of morphia. This substance, when added to saline solutions, very considerably weakens the endosmose from the serum to the solution; and ultimately changes the direction of the current. This fact has been confirmed by Dr. Bacchetti. How can we make an entire abstraction of this fact in the explanation of the action of morphia, and of the preparations of opium in diarrhœa, as well as of the constipation which they produce?

On the Inhalation of the Vapour of Ether in Surgical Operations, *containing a Description of the various Stages of Etherization, and a Statement of the Result of nearly Eighty Operations in which Ether has been employed in St. George's and University College Hospitals.* By John Snow, M.D., Univ. Lond., &c., &c. Churchill, 8vo. pp. 88.

We believe there is no Member of the profession who has had more experience in the administration of ether in surgical operations than Dr. Snow. The result of this experience is detailed in the work before us in a practical form, and illustrated by numerous cases. The description of the effects of ether at the several periods of the inhalation are in accordance with what we have witnessed; and the general rules laid down by Dr. Snow appear to be founded on accurate observation. We recommend the work to those who are desirous of practical information on this interesting subject; believing that, by attention to judicious rules in the administration of ether, much danger and mischief may be avoided. As the Chemist is occasionally required, not only to furnish the apparatus, but to administer the ether during operations, the subject is one with which he ought to be familiar.

The Prevention and Treatment of Disease in the Potato and other Crops. By John Parkin, M.D., &c., &c. London: W. Wood, Tavistock Street, Covent Garden. 8vo, pp. 84.

A Guide to the Examination of the Urine in Health and Disease, *for the Use of Students.* By Alfred Markwick, Surgeon to the Western German Dispensary, &c. Churchill. Small 8vo, pp. 154.

A Description of the Structure and Functions of the Human Skin, *to which are added some Practical Remarks on the Uses and Application of the Impermeable Spongio-Piline.* By Alfred Markwick. London: published by the Epithem Company, 32, King William Street, City. 12mo, pp. 137.

The Southern Journal of Medicine and Pharmacy. Edited by P. C. Gaillard, M.D., and H. W. De Soussure, M.D. Vol. II. No. 5. Bi-monthly. Charleston: published by Burges and James, East Bay. 8vo, pp. 120.

The late Inquest at Putney; *a Commentary on the attempted Vindication of John Rose Cormack, M.D., with an Appendix containing Important Documents, &c.* By John Farmer, Chemist, &c., Putney. J. B. Goodhinge, 4, Jewin Street, Aldersgate Street.

When shall we hear the end of this unfortunate case? In the first instance, we made some comments on it, considering that one of the parties had been unjustly attacked. It has now become a personal controversy, and the two combatants remind us of the hero, who

> "Fought all his battles o'er again,
> And thrice he slew the slain!"

TO CORRESPONDENTS.

Dr. Davies, of Regency Square, Brighton, has written to us to say, that we were in error in stating that Battley's *Liq. Opii Sedativus* is generally considered to be about the same strength as laudanum. Dr. Davies adds, Mr. Battley "avows it to be at least double the strength; one grain of opium in from seven to ten minims." We have heard various opinions on the subject; but it is difficult to estimate accurately the comparative strength of two preparations not identical in effect, especially when one of them is prepared by a secret process. We repeat, that practical physicians, in London, usually consider Battley's preparation to be *about* the same strength as laudanum, and give it in doses of twenty or thirty minims, in cases in which they would not venture to administer three or four grains of solid opium, which, according to Dr. Davies, would be the equivalent. If Mr. Battley really employs "at least double" the quantity of opium, some process must be followed by which the strength of the drug is greatly diminished.

"*A Mineralogist*" is referred to *Dana's Mineralogy* and *Plattner on the Blowpipe.*

"*Alpha's*" communication was accidentally overlooked last month. All the information desired may be obtained by calling at the laboratory at 17, Bloomsbury Square.

"*A Country Druggist.*"—The gas apparatus alluded to was constructed by Mr. Slater, of Denmark Street, Soho, who would attend to any application on the subject.

Mr. Smith and Mr. Jones will perceive that we have adopted their suggestions, for which we are obliged.

A. G. is not obliged to pass the examination, but we advise him to do so.

F. B. G. wishes to know where he can obtain cod liver oil, limpid and tasteless, as required for medicinal use. [There are several kinds of cod liver oil in the market. One kind is sold at 3*s.* 6*d.* and 4*s.* a gallon. The samples which we have seen of this oil are unfit for the stomach of any person, except a Laplander. We have no idea where a stock of the pure fresh oil is to be had, although there are two or three parties who occasionally have small quantities, which they supply as a favour at a high price.]

H. O. Z. will find both his questions answered in the sixth volume of this Journal.—(1). Page 146.—(2). 456. It makes no difference whether the composition of the medicine be stated or not.

F. W. J.—Inquires whether any drug would have the same effect as tea in keeping persons awake at night?—[Digitalis has this effect, but cannot be recommended as a safe substitute.]

W. H.—When Decoctum Cinchonæ is ordered, we think the yellow bark should be used, unless either of the others is specified.

A. P. S. (London).—It is useless for a young man to go to Paris to take a situation as an assistant to a Chemist, unless he has passed an examination. We believe Great Britain is the only country in Europe in which the qualification is disregarded.

Amator Scientiæ.—See *Fownes's Manual of Chemistry.*

A Correspondent, who uses the signature (℥j), sends a prescription as follows:

℞ Chlorid. Calcis, ʒvj.
Aquæ Puræ, ℥v. ʒij.

M. ft. Lotio.

And inquires "Whether Calx Chlorinata, its solution, or Liquor Calcii Chloridi, ought to be used for the first article ordered?" [The term "chloride of lime," has never, that we are aware, been applied to any other substance than that which, in the London Pharmacopœia, is called "Calx Chlorinata, or Chlorinated Lime;" there can be no question, therefore, that the dispenser ought to use this substance rather than Chloride of Calcium, which certainly is *not* designated by the term used, and especially as there would be no obvious impropriety in using chloride of lime in a lotion. A question would, however, properly arise as to whether the powder (as the term strictly implies) or the solution, should be used. In resolving this question, it would be well to consider what would be the result of mixing ʒvj of the powder with ℥v. ʒij. of water, and would the mixture be a suitable and usual application as a lotion? It appears obvious that the prescriber intended the solution to be used, and the dispenser would pursue the safest course in using it, unless any collateral circumstances should tend to a different conclusion.

2. The same Correspondent inquires the cause of the difficulty which occurs in effecting the combination of the ingredients ordered in the following prescription.

℞ Ext. Aloes, ʒss.
Ferri Sulphat. ʒss.
Sapon. Dur. ʒj.

M. ft. Pilul. xxiv.

In this case the soap is decomposed by the sulphate of iron, yielding sulphate of soda, and an insoluble product of the fatty acids and oxide of iron.

3. We have repeatedly stated that Scheele's Prussic Acid contains from four to five per cent. of real acid, and that made according to the London Pharmacopœia contains two per cent.

A. P. S. (*Chichester*).—In the event of a Pharmaceutical Bill being passed, we presume that a Certificate of Examination would be required from a Board or Boards recognised in the Act.

"*Cochran.*"—Hydrocyanic Acid much stronger than Scheele's may be made by the process of the London Pharmacopœia, but decreasing the quantity of water. The method of obtaining the anhydrous acid is described in *Fownes's Manual*, and all other similar works; but it is too dangerous a process to be undertaken by any but experienced Chemists.

P. C.—For an explanation of the principle and construction of the coil magneto-electric machine, see *Noad's Lectures on Electricity*, where ample details are given.

An Apprentice (*Bristol*) alludes to the difference in the colour produced on mixing Liquorice Powder and Elecampane with water; in some cases, he says, the mixture becomes black, in others dark brown, or yellowish brown.—[We have not observed this result, and can offer no explanation of it.]

Poison for Rats, Mice, and Beetles.—Mr. Moscrop, of Godalming, has sent us a sample of poison, the base of which is phosphorus. This is a more safe poison than arsenic, and we believe it is as efficacious. We have tried it in the kitchen, but cannot at present give a positive opinion, as the weather became colder about the same time. The army of beetles was dispersed, but whether poisoned or asleep for the winter remains to be shown. A poison which would clear a kitchen of beetles during the summer would be a great blessing to the public.

"*Medicus.*"—(1.) No person can be admitted as a Member of the Pharmaceutical Society without examination, unless he was in business on his own account before February 23, 1843.—(2.) Mr. Robinson, of Gower Street, is the author of a good practical work on the teeth. See vol. vi., p. 92.

S. I. C.—(1.) *Lindley's School Botany* is, we think, the best work for a beginner.—(2.) A candidate for the Minor Examination should be acquainted with all the preparations of the Pharmacopœia.—(3.) *Phillips's Translation of the Pharmacopœia* is necessary in addition to the work alluded to.—(4.) We recommend Students, at the close of their apprenticeship, to enter as practical pupils at Bloomsbury Square, before they present themselves for examination. If this be impracticable, the lectures, with private study, might enable them to pass, although probably with less credit: some Students have passed even without the advantage of the lectures.

Oxide of Zinc.—Since the publication of remarks on the impurity of Oxide of Zinc, it has been customary for manufacturers to keep two kinds, called Oxide of Zinc P.L. and Oxide of Zinc. We are informed by a manufacturer, that there is but little demand for the former, the cheaper article being generally preferred.

Errata.—In page 169 of our last Number, *E*, in Dr. Ure's Acoholmeter, is omitted in the scale to the thermometer; also, *for C read M*, opposite the small cylinder, same page.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. VI.—DECEMBER 1st, 1847.

THE ADULTERATION OF DRUGS.

In the first volume of this Journal, as well as on several subsequent occasions, we have thought it right to direct the attention of our readers to the frauds which prevail in some departments of the drug trade. In so doing we have had a two-fold object: first, the inculcation of the old, but too often neglected, maxim, that "honesty is the best policy;" and, secondly, we have endeavoured, when opportunity has presented itself, to point out the means by which such frauds may be checked or detected.

The system which we are thus endeavouring to expose and discourage is that of manufacturing drugs and medicines to suit the market, regulating the amount of substitution or dilution according to the price. This system, as might be expected, prevails to the greatest extent in export business. It is not confined to our own country, but extends its disgraceful influence throughout the globe.

It appears to be a general rule, that articles of inferior quality are "good enough for the foreign market," and while the English consumer suffers from this imposition on his credulity, in reference to foreign productions, the English manufacturer pays off the foreign consumer in the same coin.

The most effectual remedy against this international robbery would be a regular and systematic inspection of imported drugs on their arrival into the country. For this purpose a competent Board should be appointed, having authority from the Government to destroy such articles as could be proved to be unfit for use, and, in flagrant cases of imposition, to inflict a suitable penalty.

If the Pharmaceutical Chemists in this country were properly constituted and empowered by Act of Parliament, it would naturally come within the province of that body to assist in a task so important to the credit of its members and the welfare of the public. By this means vast quantities of spurious or deteriorated drugs would be kept out of the market, which, in the present inefficient state of the law, are extensively circulated and eagerly bought by those who delight in anything which is CHEAP.

THE ADULTERATION OF DRUGS.

The following circular (a copy of which has been forwarded to us by the President of the College of Pharmacy of New York), has been extensively circulated by that College, accompanied with a form of Memorial to the Honourable The Senate and House of Representatives. The Memorial recites the fact that extensive frauds are constantly practised by the manufacturers of drugs and chemicals, and briefly enumerates some of the most flagrant instances, concluding with the following Petition :—

"Your Memorialists therefore pray your Honourable Bodies that a law may be enacted, declaring that all imported articles intended for medical use, which may appear to the proper Custom House Officer to be spurious, counterfeit, or adulterated, shall be subject to competent inspection, and if found to be of base character, confiscated and destroyed."

And your Memorialists, &c.

CIRCULAR.

The undersigned, a Committee of the Trustees of the College of Pharmacy of the City of New York, respectfully solicit your attention to the proceedings of the Board on the 9th inst., viz.:

At a special meeting of the Board of Trustees of the College of Pharmacy of the city of New York, held August 9th, 1847, convened for the express purpose of taking into consideration the best measures to prevent the introduction, throughout the United States, of sophisticated and misnamed Chemical and Pharmaceutical preparations, it was unanimously

Resolved, That the officers of this Institution be requested forthwith to call the attention of the Secretary of the Treasury of the United States, to the fact that large quantities of spurious medicinal preparations are being introduced daily into this country, not only to the prejudice of the Custom-House revenue, and the honest importer, but in the sequel jeoparding the health and lives of all those who require medical aid throughout the land. That the Secretary of the Treasury be respectfully requested to apply the most stringent regulations within his power, to check this alarmingly growing evil.

It was further *Resolved*, That the Philadelphia College of Pharmacy, and other Colleges of Pharmacy and of Medicine, be officially requested to unite with us in presenting memorials to Congress, to devise means to suppress this most dangerous fraud, by making all such sophisticated articles liable to forfeiture.

In accordance with our instructions, we respectfully ask your co-operation in a general call upon Congress at its approaching session, for the passage of such a law as may effectually resist the villany of manufacturers and importers of base compounds, counterfeit and misnamed articles, intended for medicine, so far, at least, as it can be done, in their passage through the Custom-House, by competent inspection, forfeiture and exposure of the shame now borne in secret by the participators in this traffic.

A few of many facts may be stated in illustration of the urgent necessity for such a law.

Bromide is imported and sold for iodide of potassium, some parcels being mixtures, and others entirely bromide. The iodide is also adulterated frequently in large proportion with other salts of an entirely different character.

Blue pill is imported containing a per centage of mercury from ten down to seven and a half, mixed with blue clay and Prussian blue, to give the proper density and colour. Two importations of this kind from the manufactory of W****** B*****, of W**********,† have been publicly exposed by this College in the newspapers, the first in the year 1845, and the second and worse lot during the present month. Its composition according to the analysis of our Professor Reid, is

Mercury	7.5
Earthy clay	27.0
Prussian blue used in colouring	1.5
Sand in combination with the clay	2.0
Soluble saccharine matters	34.0
Insoluble organic matters	12.0
Water	16.0
	100.0

An account of the former, with the correspondence between our late President Adamson and Mr. B*****, was also published in the *American Journal of Pharmacy*, vol. 11 (new series), p. 148. The latter appears in the *New York Journal of Medicine* for September.

Very large quantities of Rhubarb, much decayed, the better parts of which are dark-coloured, with scarcely any taste or smell, having probably been exhausted to make extract come from England, invoiced there from three-halfpence to threepence sterling per pound. It is intended and used for powdering, colour being given to it by turmeric, &c.

The article called oxide of zinc on the English labels, is generally carbonate of zinc, being imported at a price which precludes the possibility of honest preparation.

All that is received under the name of precipitated sulphur (or "lac sulphur," as the merchants commonly term it) except when it is expressly ordered from an honourable manufacturer, contains from eighty to ninety-five per cent. of sulphate of lime.

Opium is often invoiced at one-third the value of good quality, and is found upon examination not to be worth even that. The same may be said of scammony.

Most of the foreign extracts are not what they profess to be, and cannot be relied upon in the treatment of disease.

The salts of quinine, morphine, and all the more costly chemicals, are greatly adulterated.

We are informed by the agent of an English manufacturer of chemicals, extracts, and many other preparations used in medicine, that it is a regular and systematic business, carried on by his principal and others in his line, to make articles for the American market of different qualities, one for the Atlantic cities, and another, very much inferior, *for the West*, meaning thereby our Western States. He gives us for instance, the following quotations: "Compound extract of colocynth, 9*s.* 6*d.*; ditto, for the West 5*s.*"—the latter, as we are allowed to infer, containing no scammony at all, only the poorest sort of aloes, and but little, if any, colocynth, or extract from it. Blue Pill, 3*s.* 9*d.*; for the West, 1*s.* 8*d.*

Is it wonderful that such enormous doses as we hear of are taken, and indeed required at the West, and that disappointment everywhere is experienced by physicians in the action of medicines? And these examples

† We omit the name and address.—Ed.

are but few out of many that might be given. Our country is held an easy prey to the rascality of foreign counterfeiters, aided and abetted by domestic traitors, who trample down all considerations of the evils they inflict, or help to fasten upon their suffering fellow men, in this unrighteous pursuit of gain. We who have more of the prominent facts before our eyes, in this greatest drug mart of the Union, than come under the notice of others, and seeing the audacity with which this base trade advances, feel ourselves especially called upon to oppose it. We believe that stringent measures should be adopted by Government to suppress it altogether, and that to obtain the proper action on the part of Congress, it is but necessary to present the facts in connexion with the general corroborating testimony of medical institutions and practitioners of medicine and pharmacy throughout the country, which we doubt not will be cordially tendered in support of our application.

We subjoin a copy of our proposed Memorial, which, if it be agreeable to you to second our efforts, you will adopt if you think proper, or (as we should prefer) set forth your convictions in your own form. We would respectfully suggest early action, as more likely to prove successful, and also the advantage of adding the signatures of Physicians and Apothecaries in your neighbourhood, as far as may be conveniently practicable. Any communications on the subject (which may be addressed to our President) will be fully acknowledged, and all information that we have, freely given.

We are, yours very respectfully,

JOHN MILHAU, *President.*
OLIVER HULL
GEO. D. COGGESHALL } *Vice-Presidents.*
WM. L. RUSHTON
JAS. I. ASPINWALL, *Treasurer.*
JOHN SNOWDEN, *Secretary.*

New York, August, 1847.

THE APPRENTICESHIP SYSTEM.

(*Continued from page* 205.)

IN our last number we pointed out the two grand abuses to which the system of apprenticeship is liable, when injudiciously enforced or incautiously adopted. An apprenticeship being a conventional arrangement between two parties, one of whom engages to instruct the other, its value obviously consists, not in the form of the indentures, but in the manner in which their spirit and intention are carried out. Our object, therefore, was to suggest a remedy for evils not inherent in the system itself, but arising, in some cases, from the too prevalent habit of mistaking the shadow for the substance, and in others, from a neglect of that kind of precaution and forethought which ought to be observed whenever a compact of several years duration is entered into between two parties.

With respect to the first of these evils we need only observe, that when an apprenticeship is insisted on, as in the case of the Apothecaries' Company before admission to examination, the term apprenticeship should be held to mean, not the possession of a formal document, in itself worthless, but the substantial advan-

tage resulting from a term of years passed in the acquirement of the requisite knowledge. The candidate should be required to produce either indentures of apprenticeship, *or evidence equally satisfactory*, of the probation implied by such indentures. It is manifestly unjust to reject the substance because the party does not possess the shadow.

In noticing the other evil to which an apprenticeship is liable, we had no intention of denouncing the system altogether. We have always considered that either an apprenticeship, or *something equivalent to it*, is necessary, but the nature of the arrangement is optional, provided always that the object be attained. The only reform which we suggest in reference to an apprenticeship, is the introduction of that kind of precaution which is observed in almost every compact between two parties.

In articles of partnership, in leases of property, in mortgage-deeds, in almost every instance in which two parties are bound by agreement to fulfil certain mutual conditions, provisions are introduced to meet the probable or possible occurrence of unforeseen events; and in case of either party being aggrieved, he has his remedy. But in an apprenticeship, two parties whose acquaintance often does not extend beyond the month of probation, bind themselves, and each other, to conditions which, like the gordian knot, can only be severed with the drawn sword. It may be true that in a majority of cases no difficulty or disagreement occurs. The same may also be said of the majority of partnerships, leases, and other agreements; yet in these latter contracts, the possibility of adverse circumstances is provided for, and why should this precaution be neglected in the case of an apprenticeship?

It must not be supposed that such a provision would lessen the authority of the master. If so, this would be a strong argument against it. We think it would have a contrary effect. If an apprentice were aware that misconduct on his part would make him liable to expulsion—that he might be sent home to his parents in disgrace, the consciousness of the fact would operate as a restraint. But while he is conscious that his master has received a premium in consideration for retaining him during the full term, and that, however insubordinate may be his conduct, he is not liable to be discharged, he naturally assumes upon the fact that his master has no remedy. This is not an imaginary hypothesis. It is founded on observation and experience, and we are persuaded that the proper security is a means of escape on either side in the event of a breach of faith on the other.

Apart from the legal view of the question, there is a moral responsibility attached to an apprenticeship which ought never to be disregarded. As soon as the indentures are signed, the master stands *in loco parentis*, and it is his duty, not only to instruct his

apprentice in his business, but also to exercise the same kind of controul and restraint which he would consider requisite if the youth were his own son. This is a heavy responsibility, and no person should undertake it unless he has the opportunity of devoting the needful time and attention to the task. The misdeeds of apprentices are too often the result of lax discipline, and the absence of the restraint which is desirable at a period of life especially exposed to temptation and in need of proper guidance. The mischief may be done before the symptoms are observed, and habits of idleness or dissipation are not easily eradicated. We maintain that prevention is better than cure, and that the evils arising from insubordination on one side, or neglect on the other, might be diminished, if not prevented, by means of a proper precaution in the terms of the contract, which, while it would rather tend to strengthen the authority of the master during its continuance, would afford an opportunity of cancelling it without difficulty on an emergency. Whether this proviso be introduced into an indenture, or whether a different kind of arrangement be adopted, is, as we before observed, optional, and should depend upon the particular circumstances of the case or the parties concerned.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

DEPUTATION TO THE SECRETARY OF STATE.

On Tuesday, the 9th of November, a deputation of the Pharmaceutical Society, among whom were the President and Vice-President, had the honour of an interview with the Rt. Hon. Sir George Grey, Secretary of State, at the Home Office, on the subject of the defects in the law relating to the practice of Pharmacy in this country.

The deputation adverted to the evils arising from the sale and preparation of medicines by incompetent persons, observing that the Chemists and Druggists had long felt persuaded that an improved law was required, not only for the security of the public, but also for the credit of their own body, whose position was by no means on a par with that of their brethren on the continent. The deputation stated, that the Pharmaceutical Society had been established in the year 1841 for the purpose of laying the foundation of the desired reform, and they now applied to the Secretary of State, in his capacity as a member of the Government, in the hope that he would be sufficiently impressed with the importance of the undertaking to assist in its accomplishment.

Sir George Grey replied, that he fully recognized the importance of the subject as a branch of medical reform, but was not at present prepared, either by himself or in conjunction with the other members of Her Majesty's Government, to embark in it as a separate question. As the Committee appointed to consider Mr. Wakley's Bill during the last session, had not completed their labours, it was generally understood that this Committee would be re-appointed on the opening of Parliament; and as registration was among the objects contemplated by the deputation, the two measures appeared to be naturally connected. It was true that a difference of opinion existed respecting the Registration Bill: some parties objecting to a general registration, and desiring a special registry for each branch of the profession. In the discussion which would ensue, Pharmacy would, without doubt, be considered, and an opportunity would be afforded for bringing forward the measure which the deputation were desirous to advocate.

The deputation observed in explanation, that the objections raised against Mr. Wakley's Bill, related not to the registration, but to the qualification conferred by such registration. No objection of this kind could apply to the case of Chemists and Druggists, and the mode of registration was of minor importance, provided the parties registered were placed in their proper rank and position. The proposal in reference to the Chemists was quite distinct from the medical registration. In fact, the medical bodies had for many years possessed a legal qualification, and the Chemists only desired that their department should be placed on a similar footing in regard to education. The Physicians and Apothecaries were recognized, and possessed a qualification by Act of Parliament, and the Surgeons had a charter which was almost equivalent in force to an act; but the Chemists possessed *in law* no qualification whatever, each individual being at liberty to pursue his avocation with or without education, according to his inclination or caprice. Consequently some persons called themselves Chemists and Druggists who were quite uneducated, which abuse was not only dangerous to the public, but tended to obstruct the advancement of medical science: since the investigations of medical men respecting the therapeutic action of remedies must of necessity be fallacious, and lead to erroneous conclusions, unless founded on the correct manipulation of the remedies for ensuring which the education of the dispensers was essential. Among the petitions presented to Parliament at the close of the last session in favour of a Pharmaceutical Bill, were contained the signatures of the leading members of the medical profession in London and provincial towns; and the public at large, on being informed of the extraordinary defect in the law on this subject, had come forward warmly in support of the proposed measure.

Sir George Grey acknowledged to the full extent the force of the arguments in favour of Pharmaceutical education, and inquired whether it was proposed to conduct the examination in conjunction with any of the medical bodies?

The deputation replied that this was not contemplated. It had formerly been proposed to appoint Apothecaries as examiners, to which the Chemists decidedly objected. It was afterwards proposed for the Chemists to unite with the College of Physicians in the appointment of a Board, but after several interviews with the representatives of the College, the plan had been abandoned as impracticable, and the Chemists were now convinced that the examinations could only be satisfactorily conducted by their own body. They had no objection to the appointment of delegates by the College of Physicians to attend the examinations, in order to satisfy the College respecting their efficiency, but claimed for their body the same independence in their own department which is enjoyed respectively by the Physicians, the Surgeons, and the Apothecaries. The deputation also particularly desired to avoid connecting the legislation in reference to Pharmacy with the present or any other Medical Bill, believing that such a course would answer no good purpose, while it would occasion delay for an indefinite time, by involving a simple question, in itself unattended with difficulty, in the interminable controversies unhappily prevailing among the medical bodies.

Sir George Grey intimated that he would further consider the subject, and make inquiries in other quarters, and he assured the deputation that he would be glad to carry out the object in view, if he could see his way clear to embark in it without the prospect of entailing on himself the perplexities which had hitherto attended the question of Medical Reform.

PHARMACEUTICAL MEETING,

WEDNESDAY, NOVEMBER 10th, 1847.

MR. SQUIRE IN THE CHAIR.

The first business of the evening was the adjudication of the prizes to the successful competitors at the examinations in the classes of Botany and Organic Chemistry.

Dr. A. T. Thomson, the Professor of Botany, reported the result of the examination in the botanical class. He expressed much satisfaction with the progress which had been made by a large proportion of an unusually large class. There had been only one subject of regret to him, and that was that so few of the pupils had competed for the prizes. There had been, as usual, a *viva voce* and a written examination. In the former,

nineteen recently-gathered plants were laid before the pupils, to be named and described. The plants were as follows :—

Ranunculaceæ ...	Ranunculus *lingua*, 1, 3, 4. Aconitum *tauricum*, 1.
Papaveraceæ	Argemone *Mexicana*, 1, 2, 3. Bocconia *frutescens*, 1.
Aragravice	Circea *lutitianæ*, 1, 2, 4.
Umbelliferæ	Myrrhis *odorata*, 1, 2, 3, 4.
Compositæ	Anacyclus *pyrethum*, 1, 2, 3, 4.
Gentianaceæ	Gentiana *Pomonica*, 1.
Scrophulariaceæ	Gratiola *officinalis*, 1, 2, 3, 4. Digitalis *purpurea*, 1, 2, 3, 4.
Solanaceæ	Solanum *dulcamara*, 1, 2, 3, 4. Datura *fastuosa*, 1. Hyoscyamus *albus*, 1, 2, 3, 4.
Labiatæ	Mentha *viridis*, 1, 2, 4. Nepeta *cataria*, 1, 2, 3. Marrubium *vulgare*, 1, 2, 3.
Malvaceæ	Althea *officinalis*, 1, 2, 3, 4.
Euphorbiaceæ.....	Euphorbia *Cyparissius*, 1, 3, 4.
Polygonaceæ	Polygonum *bistorta*, 1, 2, 4.

Of these, the competitors had severally named and described the numbers placed opposite their names :—

1. Mr. Woodward..... 19
2. Mr. Foote 13
3. Mr. Trouncer 12
4. Mr. Smith 12

In the written examination, the following questions were submitted :—

1. Describe the various forms of inflorescence, namely, the *spike*, the *spadix*, *amentum*, *strobule*, *raceme*, *panicle*, *cyme*, *corymb*, *umbel*.

2. Describe a perfect flower, the importance of each of its parts, and the distinction between it and what is usually called an imperfect flower.

3. Describe the various kinds of pubescence, and the distinction between the *sting*, the *prickle*, and the *spine*; and mention two or three examples of the importance of hairs in constituting species.

4. What is the difference in the germination of monocotyledonous and dicotyledonous seeds?

5. What is the meaning of the terms *thalamifloræ*, *calycifloræ*, *corollifloræ*, and *monochlamydeæ*?

6. Name the plant described below—the *class*—the natural *order*—the *tribe* of the order, and genus to which it belongs. Mention the natural country of the plant; and, as it possesses medicinal properties, state what these are; and whether the active principle can be procured in a separate state.

The plant is biennial, with a whitish, fleshy, fusiform root; and a hollow, round, smooth, polished, glaucous, blotched, striated stem, which rises from three to four feet in height. The leaves are large,

suprade, compound, with ovate leaflets closely and sharply pinnatified, and the lower lobes incised; they are of a bright, deep, shining green on the upper surface; and supported on long furrowed petioles, sheathing at the base. The flowers are in umbels, of many rays, and compound: the involucre five-leaved, the involucel dimidiate. The flowers are white, all fertile: the fruit is ovate, compressed, of a pale green colour: the primary ridges are elevated, sharp, wavy: and the commissure and channels finely wrinkled: there are no vittæ. The whole plant possesses medicinal properties.

The answers to these questions were sent in with mottoes attached to them. The respective merits of these answers were in the following order :—

1st..... .....*Amator naturæ.*
2d..... ....*Spes.*
3d. .....*Non initus spei.*
4th..... ...*X. Y. Z.*

Mr. Smith, the secretary, proceeded to open the envelopes containing the names which answered to these mottoes, when they were found to be as follows :—

1st.....Mr. Smith.
2d.....Mr. Woodward.
3d.....Mr. Foote.
4th. .....Mr. Trouncer.

As it appeared that while Mr. Woodward stood first in the *viva voce* examination, Mr. Smith was first in the written examination, a prize was awarded to each of these competitors. Certificates of merit were, at the Professor's suggestion, awarded to

Mr. Foote and Mr. Trouncer.

Mr. Redwood reported the result of the examination in Organic Chemistry. Mr. Fownes having been obliged to give up lecturing, in consequence of the state of his health, he (Mr. R.) had officiated for him during the latter part of the course. The examination, however, was conducted by Mr. Fownes, who had sent him a written report of the result.

The questions were as follows :—

1. What are the peculiar characteristics of Organic Compounds compared with those of Inorganic Chemistry?
2. Required a sketch of the general processes applicable to the ultimate analysis of Organic Bodies.
3. Describe the chief proximate compounds of Organic Beings, animal and vegetable, their Chemical nature, and supposed functions in the organism.
4. Give the Chemical History of Alcohol and Ether.
5. Describe the various modes of preparing Hydrocyanic acid, and the methods of determining the strength of various samples of the

dilute acid, both when mixed with water only, and when common salt, organic matter, and other substances are present.

6. Give a method of preparing Morphia and Meconic acid from Opium.

The following was the adjudication :—

LABORATORY PUPILS.

PRIZE .....*Spero.*
FIRST CERTIFICATE .....*L'esperance.*
SECOND CERTIFICATE.....*Egomet.*

LECTURE PUPILS.

PRIZE.....*Felix qui nihil expectat.*
FIRST CERTIFICATE .....*Nec aspera terrent.*
SECOND CERTIFICATE.....*Labor omnia vincit.*

Mr. Fownes stated in his report, that *Spero* and *L'esperance* were very near together, and both very good. *Felix qui nihil expectat* has answered all the questions very well, and one, the most important perhaps, No. 3, admirably.

On opening the envelopes containing the names which corresponded with the mottoes, they were found to be as follows :—

LABORATORY PUPILS.

Spero .....PRIZE .....Mr. I. L. H. Down, Torpoint.
L'esperance FIRST CERTIFICATE ...Mr. Samuel Ley Ash, Plymouth.
Egomet .....SECOND CERTIFICATE Mr. J. B. Edwards, Liverpool.

LECTURE PUPILS.

Felix qui nihil expectat.....PRIZE .....Mr. Rudall.
Nec aspera terrent.....FIRST CERTIFICATE .....Mr. Wilkinson.
Labor omnia vincit .....SECOND CERTIFICATE ...Mr. Underwood.

The prizes were severally presented to the successful competitors.

The following paper was then read :—

ON THE PREPARATION OF ACETIC EXTRACT OF COLCHICUM.

BY MR. FORDRED.

THE acetic extract of colchicum was, I believe, first brought under the notice of the medical profession by Sir Charles Scudamore, and has deservedly retained a high place amongst the remedies usually applied to the relief of attacks of acute rheumatism and gout. It was first introduced into the Pharmacopœia of 1836, where the directions for its preparation are :—

Take of

The fresh Meadow Saffron Cormus, one pound.
Acetic Acid, three fluid ounces.

Bruise the cormus, gradually sprinkled with acetic acid, then press out the juice, and evaporate it in an earthen vessel, which is not glazed with lead, to a proper consistence.

My object in bringing the subject before the notice of the present meeting, is to point out the difference in the various extracts supplied to medical men under the above appellation—to show from what cause so many prepare an indifferent article—and, lastly, to point out an improved mode of manufacture, which I have no doubt will be generally adopted in future.

I have before me samples of this extract obtained from various sources, and some prepared by myself. Some are evidently made with brown vinegar, and two show a decided gelatinization.

The cause of this gelatinization is the rupture of the starch grains by heat in the process of manufacture. I find on examination of the grains by a Ross's quarter-inch object-glass, that they are of much smaller size than wheat starch, but partaking considerably of the character of the particles of Portland arrow-root, which is prepared from one of the Arums. A drawing of this arrow-root is given in the second volume of *Pereira's Materia Medica*, page 931. In the fourth volume of the PHARMACEUTICAL JOURNAL, at page 94, a cut of the starch from the colchicum is given, as drawn by Schleiden ; but that which I have examined differs materially, the grains appearing principally mullar-shaped.

The gelatinization takes place at a temperature of 140° Fahr., whilst wheat-starch does not gelatinize until the heat reaches 170°.

Mr. Garden, of Oxford Street, I believe, was the first person who prepared this extract, under the superintendence of Sir Charles Scudamore, and some practitioners to this day will use none other. His extract, as we learn from Sir Charles's work, is prepared by evaporating the *acetum colchici* to a thin consistence ;* but as this differs entirely from the Pharmacopœia process, such extract is removed without the pale of our examination. The others profess to be Pharmacopœia articles, and are therefore open to our animadversion.

An analysis of the fresh cormus (gathered in October), made by Stoltze, gives the following constituents :—

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* "I sometimes prefer the administration of the acetum colchici reduced to the solid form, and in a pill. The idea of making a preparation of this kind occurred to me some years ago, when I requested Mr. Garden, of Oxford Street, to evaporate the acetum colchici down to the consistence of a soft extract, over a water-bath, at so low a temperature as to be free from all risk of decomposing the material ; in which state it may be considered that one grain is equivalent to eighty minims of the fluid. I commonly direct two grains of the subcarbonate of ammonia to be united with one grain of this extract, conceiving that the medicine agrees better with the stomach when the acid is neutralized."—*Scudamore on the Treatment of Gout, and the Use and Abuse of Colchicum*, 2d edition, p. 90.—1833.

Volatile acrid matter	a trace
Soft Resin	0.06
Crystallizable sugar	1.12
Uncrystallizable sugar	2.72
Bitter extractive	2.17
Difficultly soluble extractive	0.52
Gum, like tragacanth	1.65
Extractive, soluble in potash	0.52
Lignin	1.61
Starch	10.12
	20.49
Water	80.31
Colchicum Cormus	100.80

By this it appears that a very large constituent of the cormus is starch, amounting, in fact, to nearly 50 per cent. of the solid matter. It is from an inattention to the presence of so large a proportion of starch that badly-prepared extracts are so frequent.

The plan which I have adopted and practically applied, on the large scale, for some years, is as follows:—

I take the fresh cormus, and bruise it well in a large marble mortar with a wooden pestle; as successive portions of it are crushed they are thrown into a large pan or tub; and when the whole is finished, I pour over the mass the requisite quantity of acetic acid—of the strength ordered in the Pharmacopœia—which costs about 7*d.* or 8*d.* per lb. (I name this as, in some instances, I have known acid costing 3*s.* 6*d.* per lb., and much stronger than the Pharmacopœia acid to be used). This is allowed to macerate two days, occasionally stirring with a wooden rod. It is then pressed off, and the liquid strained through a coarse sieve, merely to remove the solid pieces of cormus which are forced through, but not to interfere with the starch. It is then allowed to settle, and the supernatant liquor drawn off, leaving the bed of starch at the bottom undisturbed. The liquid is then rapidly evaporated in a well-tinned pan, and when reduced to what the operator considers sufficient, is mixed in with the residuary starch, and finally reduced to extract consistence by a heat not exceeding 100° Fahr., so as to avoid the gelatinization of the starch.

By this process the average produce from one *cwt.* of colchicum cormus is 14*lbs.* of acetic extract; and this is found to tally with the result obtained by using the Pharmacopœia quantities, and following the Pharmacopœia process, strictly.

The deposit of starch usually amounts to $\frac{1}{32}$ part of the bulk of the expressed liquid.

Almost all manufacturing processes, when conducted on a large scale, differ in their manipulation very materially from

those which are carried on by the amateur Pharmaceutist, or even as ordered by the Pharmacopœia. For instance, in the foregoing process, if the acid were added to the cormus in the course of bruising, as directed, in how many laboratories would you find a Wedgewood, or other suitable mortar, sufficiently large to effect this, without itself being attacked by the acid? Whereas, by modifying the process as above stated, we arrive at the same result as that indicated by the Pharmacopœia.

The great error in manipulating this extract has been in evaporating the acid liquor as it issued from thepress *with the admixture of starch;* directly the necessary heat was applied of course the starch immediately gelatinized, as in the sample extracts before us, and no subsequent exsiccation could produce a creditable extract. Some have said that the clear liquid should alone be evaporated. I have a sample of an extract so prepared here; it has the same appearance, and is of the same consistence as Mr. Garden's preparation, but there is this peculiarity attached to this mode of manufacture,—that the product, although evaporated to a pill consistence, rapidly attracts moisture and becomes thin, causing great annoyance to the dispenser. This is occasioned by the absence of the starch, which gives a body and tenacity to the extract. But it must likewise be remembered, that in thus manipulating we are exceeding the bounds prescribed by our Pharmacopœia, and have produced a mass possessing nearly double the strength of the Pharmacopœia article; and this is a point on which I would just say that many of our Chemists, in recommending their own peculiarly prepared extracts have entirely forgotten the law by which they should be governed in preparing them, and that is,—that although "*the college no longer insist that the medicines which they direct should be prepared exactly in the mode described,*" yet the resulting product must be equivalent in *strength* and *purity* with their preparation. These remarks particularly apply to the extract of Taraxacum, which of late many have prepared simply by evaporating the expressed juice; and to those unacquainted with the data, it may appear astounding to be informed, that one *cwt.* of dandelion-root treated by the Pharmacopœia process, yields on an average 24 *lbs.* of extract, whilst the *juice only* from another *cwt.* of the same root, at the same time of year, yields but 4*lbs.* of pharmaceutical extract. Now, although any surgeon may certainly order these or any other peculiarly-prepared extracts to be used in dispensing his own prescriptions, yet it should ever be borne in mind that the ordinary Druggist is by no means justified in using such preparation in the compounding of every-day prescriptions.

I may observe, that in making the acetic extract of col-

chicum on a small scale, the pulpy mass may be pressed in an ordinary iron tincture-press (if the process be conducted *rapidly*) without injuring the product, although of course wood is preferable; and in conclusion I would remark, that an extract prepared according to the directions given in this paper, and carefully finished, would be of full pill consistence—not requiring any admixture of licorice or other powder when dispensed, therefore saving trouble to the dispenser, and ensuring to the patient the full dose intended for him by his medical attendant, which cannot always be the case when a thin extract is used. A sample bottle of it is deposited in the Museum of the Society.

Church Street, Hackney, Nov. 9, 1847.

ON THE MEANS OF PREVENTING CONTAGION, AND ON A NEW CHLORINE FUMIGATOR.

BY MR. SMITH.

My attention was first directed to the necessity of devising every possible means for purifying the atmosphere, in consequence of the immense amount of contagious diseases in crowded localities. The origin of these diseases seems to depend on the existence of large quantities of putrescent matter, allowed to accumulate in low neighbourhoods, the houses and apartments frequently damp and ill-ventilated. There is usually a deficient, and sometimes an entire absence of proper drainage, and the water that is supplied for the use of the inhabitants is not pure in quality nor sufficient in amount. All these circumstances powerfully co-operating with others of a depressing nature, such as the poverty of the lower orders, their depravity, their deprivation of good food and clothing, and, in too many instances, their excessive indulgence in spirit drinking, occasion the rapid spread of contagious and epidemic diseases.

The removal of putrescent matter cannot at all times be speedily effected, and it frequently happens that the proper authorities are not aware of its existence until their attention is directed to it by the fearful amount of mortality it has produced.

Effectual sewerage or drainage requires a length of time, and to combat often with the "law's delay," and opposition of the most strenuous kind from those who appear to have a "vested interest" in abuses.

It is a well-known fact that the water supplied in London is, for the most part, exceedingly impure, and contains a large average of decomposed matter in solution. In many courts there are public tanks to supply their residents, which are never cleaned out.

Numerous manufactories are most pernicious to health, and yet their reeking vapours, and their noisome smells, are allowed to pervade the atmosphere, alike detrimental to comfort and obnoxious to animal and vegetable life.

The graveyards, too, are like huge ulcers in the body of this metropolis. Their noxious effluvia, generated by the decomposition of dead bodies lying closely together, layer upon layer, and near the surface, percolate the lightly-covered earth, and spread disease and death all around their dreadful neighbourhood.

The removal of all these sources of evil, a strict attention to individual cleanliness, as well as that of a public nature, and free ventilation, are the measures that will enable us to ward off contagious epidemics, and to promote a higher average of sanatory condition. It is occasionally required, where adverse circumstances exist, and where, perhaps, epidemics are already prevalent, that other measures, more prompt, though less efficacious than the preceding, should be adopted. To this end Chemistry has lent her aid; and the neutralization of those substances that produce noxious effluvia, and thus disarming miasma of its virus, has been aimed at by several philosophers of the present day.

Besides the essential constituents of the atmosphere, namely, oxygen and nitrogen, the proportions of which are invariable, there are always present variable quantities of watery vapour.

Carbonic acid is present in minute quantity; also numerous other substances in different times and situations, as the odoriferous matter of flowers, carburetted hydrogen; and muriatic acid has been said to be detected at the sea-shore.

The human body is greatly influenced by the degree of aqueous vapour present in the atmosphere, and the origin of many epidemics has been satisfactorily traced to their connexion with this cause, while a warm dry wind is particularly unfavourable to infection.

Many disputes exist as to the origin of miasm, and in what miasm consists, and here we had rather state our entire ignorance of its principles, or its elementary composition, and having considered its effects on the organic life, we proceed to consider one of its most frequent causes, that of putrefactive fermentation.

Organic compounds are remarkably prone to decomposition from the reaction of their elements; and, in this circumstance, differ widely from most inorganic bodies. The changes produced in this manner are included under the term *fermentation*.

Most organic matters are subject to *putrefactive* fermentation. Some organic principles, more especially oils and inflammable matters containing much carbon and hydrogen, are not decomposed in this manner.

Chlorine in its various combinations, has deservedly held a high repute as a disinfectant.

Dr. A. T. Thomson, in his *London Dispensatory*, fol. 740, says—

"But the most important use of chlorine is in its gaseous form, as a fumigation for neutralizing putrid miasmata and correcting the infectious atmosphere of hospital wards and rooms in which have been cases of contagious fevers. For these purposes it is better adapted than the common hydrochloric acid gas; but as both of them are highly deleterious to animal life, they should be employed in such apartments only as the sick can be removed from while the gas is extricated. By this process the offensive odour of the sick-room is destroyed, the chemical constitution of the deleterious atmosphere is altered, and its freshness completely restored."

The chlorides of lime and soda first brought into use by Labarraque operate by the evolution of the chlorine contained in solution.

Sir William Burnett's chloride of zinc, Ledoyen's nitrate of lead, and also Ellerman's recently discovered disinfectant, are useful in acting on putrescent matter, modifying noxious effluvia, and checking the putrefactive fermentation; but when the vapour has already risen, and has traversed from its original source to some distance, then must the atmosphere be impregnated with the chlorine, assisted by free ventilation and the removal of all circumstances liable to cause an attachment or temporary absorption of the virus.

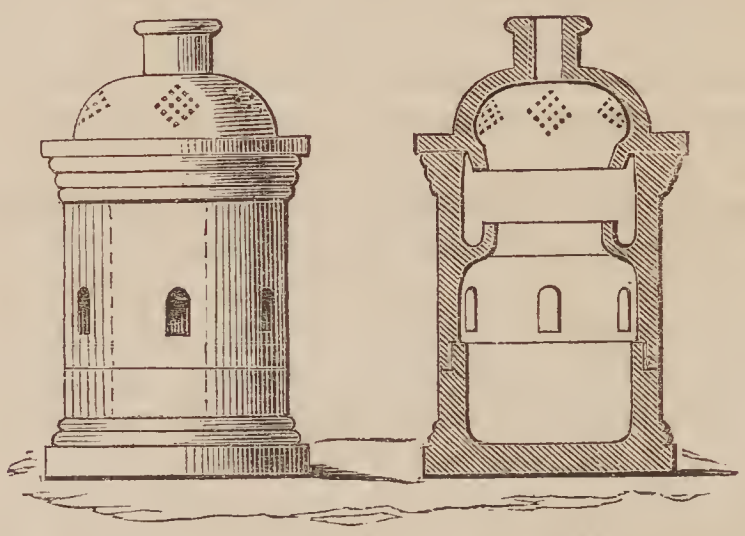
Mr. Herapath of Bristol, has stated in a letter to the *Times* newspaper of Oct. 12th, 1847, that chlorine was the only disinfectant to be relied on, in case of the cholera making its appearance in England. On the other hand, it has been denied by many physicians in Russia, who had ample means of testing its efficacy in 1831, that chlorine was at all useful—and several eminent authorities deny that chlorine can be relied on as a specific in cholera, although they consider its efficacy has been proved in many other infectious diseases, as scarlatina, typhus, &c.

The evolution of chlorine to be useful must be *continuous* in its supply, and not in sufficient quantity to be injurious to health or detrimental to the furniture of a house: to this end has been constructed the Chlorine Gas Generator, an apparatus whereby chlorine gas is slowly and continuously evolved during a lengthened period.

It consists of a jar divided into three parts; the lower portion to contain the salt and manganese, the centre part is made with an interior shallow ring to hold the acid, and the top is merely a perforated lid to allow the escape of the gas. The acid is slowly combined with the manganese by means of a few loose-spun cotton threads immersed in the acid and hanging over the side of the interior ring or trough, the lower ends of the threads reaching

beyond the bottom of the ring; by this arrangement they act as syphons by their capillary attraction.

The charge requisite for an apparatus of this description, to act for twenty-four hours and suitable for a ten-roomed house, would be three ounces of black oxide of manganese in powder, mixed with eight ounces of common salt dried, and five ounces by weight of sulphuric acid, mixed with four fluid ounces of water.



By means of this apparatus a continuous supply of gas is disengaged in so diluted a form that it might be inhaled with impunity, and by means of an ample current of air might be conveyed to all parts of the house.

Dr. A. T. Thomson confirmed this latter remark, observing that chlorine was useful, when diluted with atmospheric air, in some diseases of the lungs; and that in the neighbourhood of Messrs. Tennant's manufactory for chlorides, there were many persons residing who had been considered to be suffering from pectoral complaints, and had obtained efficient and permanent relief.

Dr. Thomson added, that although the efficacy of chlorine as a disinfectant had been disputed, its value in arresting the progress of scarlatina had been demonstrated, in some cases which had come within his experience, in a manner admitting of no doubt.

On this question some discussion ensued, several authorities being quoted on both sides. It appeared to be the general opinion that the incautious use of agents so powerful and deleterious as chlorine gas, by inexperienced persons, should be by all means discouraged; but that, so long as some practical men entertained a belief in the efficacy of chlorine as a disinfectant, facility should be afforded for its safe and convenient exhibition, and the apparatus contrived by Mr. Smith was well adapted for this purpose.

TRANSACTIONS OF THE BRISTOL CHEMISTS' ASSOCIATION.

We are requested to correct an error in the report of last month, page 214, the name of Mr. G. Corbould having been placed second on the list of Candidates, instead of that of Mr. Samuel Burdge. The report was printed *verbatim* according to the copy furnished to us, as we believed, officially. The commencement of the address of Dr. Staples was correct (page 214) but the error occurred in the following sentence, which should have stood thus :—

Though the superiority of the answers he had alluded to was very distinct, he could not refrain from complimenting one of the students, who, although not standing first or second on the list, but as being a very young man (and as he understood) only a short time in the business, had answered the questions in a manner highly creditable to him,—he alluded to the gentleman whose motto was "Juvenis."

The mottoes, when examined, were found to correspond with the following names.

No. 1. "Spes,".....Mr. E. Clift.
No. 2. "Hirudo,".....Mr. S. Burdge.

THE BIRMINGHAM PHARMACEUTICAL INSTITUTION.

We have received a copy of an inaugural address, delivered by Dr. Samuel Wright at the Birmingham Pharmaceutical Institution, on the 10th of November. If our space had admitted of giving an abstract of it, we should have been glad to have done so, as an encouragement to our brethren in other places to follow so praiseworthy an example. The proceedings of the Bristol Association have already been noticed, and we are glad to find that lectures are instituted in Birmingham for the benefit of Pharmaceutical Chemists. We shall have pleasure in publishing, from time to time, reports of the progress of this Association, or of any others of a similar character, believing that in formation respecting such undertakings acts as a stimulus, and increases the general desire for Pharmaceutical education. We hope the time is not far distant when branches of the Pharmaceutical Society will be in active operation in the large towns throughout the kingdom, disseminating scientific knowledge, and thus preparing students for their examination. Although some of these provincial associations are independent of the original Society, we are no less disposed on this account to encourage their formation, believing that all the efforts, made in the right direction, will eventually lead to the same result, namely, improved education; and that, sooner or later, these efforts will be amalgamated and united into one grand scheme for raising the scientific standing of British Pharmaceutists.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE ACETOUS FERMENTATION OF SOME OF THE ALCOHOLIC PREPARATIONS OF THE PHARMACOPŒIA.

BY MR. WILLIAM BASTICK.

In all the works on Materia Medica and Pharmacy which I have examined, where the subject is alluded to at all, it is stated that the tinctures of the Pharmacopœia are very stable preparations, and that the only deterioration which takes place in them is that caused by the evaporation of the spirit, producing, in consequence, either a more concentrated tincture, or precipitating a portion of the materials held in solution. That the above statement falls far short of the real facts is well known by all Pharmaceutists, from the circumstance that most of the tinctures made with proof spirit undergo a gradual change, which ultimately ends in rendering them comparatively inert and worthless.

With a view to ascertain what was the general nature of the change to which these alcoholic preparations were liable, portions of various ones were kept many months in the ordinary circumstances in which they would be placed by their consumption in a Druggists' shop, such as being in bottles half-filled in a temperature varying from 60 to 80 degrees of Fahrenheit, and occasionally admitting fresh air.

After a lapse of time, most of them, on examination by the proper tests, were found to have undergone the acetous fermentation in a greater or lesser degree—the alcohol having been gradually converted into acetic acid. The tinctures were generally diminished in colour and taste, and contained a precipitate, a portion of which was re-soluble on the addition of a sufficient quantity of spirit to supply the place of that decomposed. This circumstance shows that a part of the precipitate was caused by the decomposition of the alcohol, and a part by the destruction of the vegetable principles themselves. When the tinctures in this condition were completely exposed to the action of the atmosphere at a sufficient temperature, the alcohol contained in them was speedily and entirely converted into acetic acid.

The proof-spirit tinctures most liable to the acetous fermentation are those which contain those proximate principles in solution which are prone, *per se*, to decay, the spirituous menstruum not having sufficient antiseptic power to permanently resist their decomposition. The tinctures made with rectified spirit are not susceptible of any change of a similar character, neither are the tinctures above spoken of, when the strength of

the spirit is considerably increased, arising from the insolubility of some of the proximate principles prone to decay in the stronger spirit, as well as its antiseptic quality.

That the acetous fermentation is induced in the tinctures by the presence of bodies in a state of change, acting as a ferment, is clear from the fact that a mixture of alcohol and water will not ferment without the presence of some such body. It is also evident that the vegetable substances held originally in solution have been subject to a material change by the loss of colour and taste of the tincture, and by it containing a precipitate, a portion of which was insoluble in a mixture of alcohol and water.

Some of the preparations most prone to this change are the tinctures of senna, rhubarb, columba, henbane, digitalis, bark, hops, aloes, compound tincture of cinnamon, compound decoction of aloes, concentrated infusions, fluid extracts, and all similar preparations, especially those which are weaker in spirit than the tinctures. Many complaints have been made by Pharmaceutists, of the proneness to decomposition of the compound decoction of aloes, and they have suggested remedies for its prevention; but none have pointed out the general nature of the process of decay, which differs somewhat from the tinctures from carbonate of potash being used in its fabrication.

If the decoction is examined when first prepared, after having been sufficiently boiled, it will be found that the carbonate of potash has been decomposed by the resinous acids of the myrrh and aloes. On the addition of acetic acid no carbonic acid will be evolved, but the resinous matter which is in combination with the potash, forming compounds analogous to the soaps, will be precipitated, and may be re-dissolved by more of the alkali or alcohol. When the acetous fermentation has sufficiently advanced in the decoction, the alkali will be found in combination with acetic acid, which acid has precipitated the resinous acids from the base. Crystals of acetate of potash may be obtained by evaporating the clear portion of the decoction. The resinous matter may be separated from the precipitate by the action of a solution of carbonate of potash.

From the above statement may be gathered answers to the questions which have been so often asked, as to whether compound decoction of aloes ought to be clear or opaque, and in what condition it is proper to use it. Compound decoction of aloes, fluid extracts, and all other analogous aqueous solutions of vegetable substances, when the spirit is added which is used to preserve them, will precipitate a portion of the proximate principles held in solution, because they are less soluble, or quite insoluble in such a mixture of water and alcohol. This precipitation does not frequently occur at once, from the circumstance

that the spirit is added to the solution before it is cooled down to that temperature at which the principles become insoluble in the mixture. It is therefore prudent not to add the spirit until the preparation has acquired that temperature to which it is exposed in the course of consumption. Should a precipitation occur after these precautions have been adopted, it may be taken as a tolerably clear evidence that the preparation is decomposing; consequently it is manifest that when the decoction is in this condition, neither the clear portion, nor the clear and thick together, should be used for the purposes of that ordered by the Pharmacopœia, as the whole must necessarily be changed in its properties. As we are expressly forbidden to alter the constitution of any of the preparations of the Pharmacopœia, any suggestions to remedy the evils complained of by such means are futile. There is but one course open to us, viz., to inquire under what conditions can these preparations be kept most powerful to resist their tendency to decomposition? The answer will be, that as far as circumstances will permit to keep the preparations in bottles, filled and well closed, and in a low temperature, which are the conditions found to be least favourable to the development of the acetous fermentation.

Brook Street, November, 1847.

SOME FURTHER PARTICULARS RESPECTING THE RHUS METOPIUM, OR HOG-GUM TREE.

(*Being a Supplement to the Paper inserted in the August Number of the* Pharmaceutical Journal *for* 1845, *p.* 60.)

Since the publication of my former notice of this interesting and valuable tree, I have been favoured with a small specimen of the medicinal gum which it yields, and a variety of cases illustrative of its efficacy in medicine.

The *Rhus metopium* is by no means common in the islands of the West Indies, requiring for its growth a climate far more temperate than the usual altitudes of the smaller islands afford. From the information I have been able to collect, its range appears to be confined within the limits of from 1,500 and 2,000 feet.

The altitude of the central mountain in Nevis (as determined in May, 1814, by a careful measurement of the angles of elevation at each end of a base of 3,260 feet, measured with a pedometer, a little to the north of Charlestown, along the beach, by Mr. Kalman and myself) appears to be 3,260 feet—a height which exceeds the highest limits of the *Rhus metopium*, and renders it not improbable that future travellers, by directing their inquiries more especially to it, may yet detect it there—a discovery which could not fail to be productive of the happiest results to that

island, by adding to the number of its exports, since I feel assured that when once its value comes to be fully understood in the medical world of Europe, the demand will far exceed the capabilities of all the sources of supply that can, by any possibility, be pressed into the service.

It may also be sought for, with equal probability of success, in the higher elevations of the central ridge which traverses the body of St. Kitts, many points of which attain the requisite altitude, and some, as for example, the volcanic ruin of Mount Misery (which is stated in Baker's map of the island to reach to 3,711 feet) pass that limit.

The cone of the Souffriere, in Guadaloupe, attains, according to the barometric measurement made in 1815 by Captain Baralliere, an elevation of 5,384 feet, and the vast mountain mass which forms the major part of the Basseterre, or western division of the island, attains in many places an elevation but little below that of the cone of the Souffriere, and I found the temperature, at nine o'clock in the morning in the month of January, although enveloped in the smoke of the two large craters which occupied its summit in 1816, down to 52° of Fahrenheit. Hence it is not improbable that the *Rhus metopium* may be found dispersed, at various points, within the assigned limits, throughout this Alpine range.

Martinique also presents many elevations, attaining and passing considerably beyond these limits.

St. Vincent and Grenada, together with Dominica and St. Lucia, are also favourable to the existence of this tree, their mean elevation not falling short of the limits within which it has been observed in Jamaica; and if not naturally existing in these localities, its introduction is much to be desired, as, without interfering with any of the existing staples of the islands, it would add variety to their exports, and confer no small value upon regions at present comparatively worthless and unproductive.

Of late its value begins to be so well understood in Jamaica, that it has already become difficult to procure it; the house of Menzies and Co., at Kingston, buying up all that is brought into the market, and not content with the produce obtained from incisions in the trunk, they now search in the neighbourhood of its roots for that which has been deposited by them beneath the surface of the soil from the extravasation of the sap—a phenomenon common to it and several other kinds of trees. A similar extravasation takes place from the roots of the *Hymenea courbaril*, or *locust-tree* of the West Indies, which may possibly form the subject of a future paper, and also from those milky trees of South America, whose sap yields the *caoutchouc* of commerce. This latter extravasation affords a substance known by the Indian

name of *Dapicho*, which differs slightly in its external appearance from the *caoutchouc* obtained by incisions made into the trunk. Humboldt witnessed the process for obtaining both the *dapicho* and the *commercial caoutchouc*, and his account is so interesting, and abounds in so many valuable suggestions, that notwithstanding its length, I trust I shall be pardoned for giving an extract, which may be new to many into whose hands this paper may chance to fall.

"In this forest we at length obtained precise information respecting the pretended *fossil Caoutchouc*, called *Dapicho* by the Indians. The old captain Javita led us to the brink of a rivulet which runs into the Tuamini, and showed us that after digging two or three feet deep, in a marshy soil, this substance was found between the roots of two trees, known by the names of the *Jacio* and the *Curvana*. The first is the *Hevea* of Aublet, or *Siphonia* [elastica] of the modern botanists, known to furnish the *caoutchouc* of commerce in Cayenne and the Grand Para; the second has pinnate leaves, and its juice is milky, but very thin, and almost destitute of viscosity. The *dapicho* appears to be the result of an extravasation of the sap from the roots. This extravasation takes place more especially *when the trees have attained a great age, and the interior of the trunk begins to decay.* The bark and alburnum crack, and *thus* is effected *naturally*, what *the art of man* performs, to collect, in abundance, the milky juices of the *hevea*, the *castilloa*, and the *caoutchouc fig-tree*. Aublet relates that the Galibis and the Garipons of Cayenne began by making a deep incision at the foot of the trunk, so as to penetrate into the wood; soon after they join with this horizontal notch, others, both perpendicular and oblique, reaching from the top of the trunk nearly to the roots. All these incisions conduct the milky juice towards one point, where the vase of clay is placed, in which the *caoutchouc* is to be deposited. We saw the Indians of Carichana operate nearly in the same manner. If, as I suppose, the accumulation and overflowing of the milk in the *jacio* and *curvana* be a pathological phenomenon, it must sometimes take place at the extremity of the longest roots, for we found masses of *dapicho* of two feet in diameter, and four inches thick, eight feet distant from the trunks. *Sometimes you dig in vain at the foot of dead trees*, at *others* the *dapicho* is found beneath the *hevea* or *jacio* still green. The substance is white, corky, fragile, and resembles by its laminated structure and undulating edge, the *Boletus igniarius*. The *dapicho*, perhaps, takes a long time to form, it is probably a juice thickened by a particular disposition of the vegetable organs, diffused and coagulated in a humid soil, secluded from the contact of light, it is *caoutchouc* in a particular state, I had almost said an *etiolated caoutchouc*. The *dapicho* is certainly not peculiar to the forest that extends from Javita to Pimichin, although this is the only spot where it has hitherto been found. I have no doubt, that on digging in French Guyana, beneath the roots and old trunks of the *hevea*, those enormous masses of corky *caoutchouc* which I have just described, would be found. As it is observed in Europe that at the fall of the leaf the sap is conveyed towards the root, it would be curious to examine whether, within the tropics, the milky juices of the *urticeæ*, the *euphorbiaceæ*, and the *apocyneæ*, descend also at certain seasons. Notwithstanding a great equality of temperature, the trees of the torrid zone follow a cycle of vegetation, of changes perpetually returning."—*Pers. Narr.*, vol. v., p. 263, *et seq.*

This concluding observation is most strictly true, and arises, in my opinion, from the joint operation of the solar and lunar

attractions; hence, within the tropics, the cycle, in place of being merely annual, is regulated by the monthly phases of the moon, modified, as might be anticipated, by the position of the sun in the zodiac. As Dr. Robertson very truly observes, in his *General View of the Natural History of the Atmosphere, &c.*, vol. ii. p. 246: "It has been mentioned in the earliest records of science, that the influence of the moon has a very considerable effect upon all sorts of vegetable productions. The powerful effect of moonlight in ripening grain seems to be a remark *coeval with cultivation.* It has been observed that, in the West India islands, all sorts of vegetables are fuller of sap at the time of new (?) and full moon; the colonists, therefore, carefully abstain from cutting wood for the purposes of cabinet work at these periods. On the other hand, these have been reckoned the fittest seasons for gathering sugar-canes and castor-oil nuts; and it is said, the latter even yield a fifth or a fourth more of oil in these circumstances."

This remark of the doctor requires some little correction. The sap does not ascend in vegetables, nor are their vessels so full of it at the time of new as of full moon. The period of new moon, notwithstanding it might be expected to evince the most powerful sol-lunar influence, from the circumstance of the two attractions acting in the same direction, manifests, on the contrary, the minimum of that influence, and corresponds in its effects on vegetation, with the winter solstice; while the period of full moon, when the two planets are in opposition, with our globe between them, and when, consequently their attractions act in opposite directions, corresponds in its effects with the summer solstice, manifesting a greater vigour of vegetation, and a greater amount of sap in the vessels. From the period of *conjunction* to that of *opposition*, the direction of the sap is *ascending;* from that of *opposition* to that of *conjunction*, it is *descending;* but for about three days before and as many after each of these periods, the motion of the sap is nearly stationary. Hence, practical experience has taught the planters that durability, even in the most imperishable timbers, as the *Guayacum officinale*, and *Sloanea dentata*, or *Break-axe tree*, is only to be secured by cutting them during the *wane*, not the *increase* of the moon. With respect to the theory of this monthly ascent and descent of the sap in vegetables, I will not hazard any opinion of my own; since the phenomena undoubtedly present some circumstances of difficult explanation on the simple supposition of the combined attraction of the sun and moon. It is far from improbable that the lunar light contributes materially to the production of the effect, since the *ascent* of the sap corresponds with the *increasing*, and its *descent* with the *decreasing duration* of the lunar light

in the absence of the sun. All I pretend to vouch for is the fact of this monthly circulation, which is familiar to every planter, and meets with incredulity only in regions beyond the tropics. How far the barometrical tides correspond with the motions of the sap, I have no means of determining, having made no observations of my own on the subject; but it is well worth the consideration of future observers to inquire whether any, and what connexion subsists between the two phenomena.

From a consideration of the facts just stated, it appears probable that the supply of hog-gum might be materially increased by making incisions in the trunk of the tree during the increase of the moon, and adopting a similar process with the roots during her wane.

This double drain, however, could not fail to impair the vigour and abridge the duration of the tree, rendering it necessary to keep up a constant succession of young and vigorous plants.

Another matter remains for consideration, viz. how far the properties of the gum are different or identical when obtained from the trunk, during the ascent, or from the roots, after the descent of the sap. We all know that light exercises a powerful chemical influence, and that substances excluded from its action vary considerably in their composition from those which are freely exposed to it: upon this fact rests the theory of etiolation. Humboldt has hinted at something of this kind with respect to the *dapicho:* and it is hardly to be imagined that a gummy substance, like the extravasated sap of the *Rhus metopium*, should be less sensible to the chemical action of the solar rays, than the more untractable milk of the *siphonia*, the *ficus*, or the *castilloa.*

To return, however, from this digression, to the more immediate object of the present paper, namely, the cases which accompanied the specimens of hog-gum given to me by my friend Captain Wright. The weight of the larger fragments does not exceed 134 grains, and their musky odour seems to have been little affected by the number of years which has elapsed since they were first obtained from the tree.

The cases which I am about to relate illustrate the effects of the gum as an external application; but, from the beneficial results of its trial, in the case of Sir Amos Norcott, who was evidently suffering from extensive visceral derangement, it appears to be worthy of trial as an internal remedy. Externally its effects appear to be sub-stimulant and counter-irritant.

The first of the cases in which Captain Wright had an opportunity of testing its properties was his own: he had received some severe injuries by a fall from his horse, fortunately unaccompanied by any fractured bones or dislocated joints; from

the effects of these he speedily recovered, by the application of a large plaister of this gum over the parts which had been bruised.

The second was that of a lady, who had been under medical treatment for what had long been supposed to be a case of hepatitis; but, at length, finding that no progress was made towards recovery, a closer examination was instituted, when a considerable tumour was discovered in the left hypochondrium, indicating the existence of disease in the spleen. After various inefficient attempts to discuss this tumour by the usual remedies, a plaister of the *hog-gum* was, on Captain Wright's suggestion, applied over the part, and, after a little time, effected a complete dispersion of the swelling. This was many years ago, and the lady, from whose own mouth I received the particulars, is now in England, and in good health.

A third case was that of a son of Captain Wright's, who, when a child, had the muscles of the humerus partially torn from their insertion into the scapula, by a violent pull given to his arm by a servant, on ascending the stairs, which threatened a total loss of the use of the limb for life. When, at the end of about a fortnight, the case had been pronounced hopeless, a plaister of *hog-gum*, spread upon leather, was applied to the part; in less than a fortnight from its first application, a re-union of the muscular fibres to the scapula took place, with freedom of motion in the limb as perfect as before the accident. The patient is at the present moment a fine active officer in the army, and in the full possession of the use of all his limbs. This case was witnessed by Surgeon Earline, of the Army Medical Staff, stationed at Port Antonio, to whom the child was taken in the first instance; as also by Dr. Henderson, of Port Antonio, who attended with him.

A fourth case was that of Sir Amos Norcott, commander of the forces in Jamaica, who had long laboured under a hopeless derangement of the chylopoietic viscera, which baffled all the skill of his medical attendants, attenuated his frame nearly to a shadow, and prostrated his strength to the helplessness of infancy. Such was the irritability of his stomach, that neither food nor medicine could be retained, and he was hardly capable of bearing the slightest motion. In the hope of benefitting by the bracing effects of a cooler temperature, he was carefully removed to an estate situated at a considerable elevation, but without obtaining the desired result; and, after his return to Kingston, he was unable to encounter the fatigue of a second transport to Fort Royal, for the purpose of embarking in the packet, and seeking the restoration of his lost health in the genial breezes of his native shores.

His case was regarded by all as beyond the pale of hope, and his death viewed as a certain, and not very remote event. In this extremity of despair, Captain Wright suggested to Dr. Arnold, of Kingston, as a forlorn hope, a trial of the external application of the *hog-gum*. An ample plaister of the gum was applied over the whole region of the abdomen; and, in a space of time incredibly short, when his previous state is taken into consideration, he was able to bear removal to the packet, made the passage across the Atlantic without inconvenience, and survived his return at least six months.

The circumstances of this case were communicated to Captain Wright by Dr. Arnold after the General's embarkation, and he has not the slightest doubt of the perfect accuracy of the report.

Brigadier-General Williams, of the island militia, was a fifth who experienced its salutary effects. Indulging somewhat too energetically in the pleasures of the dance, he strained the gastrocnemius muscle of one of his legs to such a degree as threatened him with lameness for life. The application of a plaister of the *hog-gum*, on the recommendation of Captain Wright, restored the muscle to its pristine tone; and although the impatience with which he bore the trifling irritation it produced on his skin, led to its removal before the cure was complete, all fear of any permanent lameness was wholly removed.

In all cases repose is essential to the sanative effect of the gum, which is imperceptible in its progress, and marked only by a slight local irritation. Dancer speaks of it under the name of *Hermannia*.

The specimen which accompanies this paper, and for which I am indebted to the kindness of my friend Captain Wright, weighs about 134 grains, and was dug out of the ground at the base of a decaying tree of the *Rhus metopium*, which grew upon his land, in the mountainous part of the parish of Portland, in Jamaica, where the plant grows spontaneously and in considerable abundance, at elevations of from one to two thousand feet above the sea.

In spreading the gum as a plaister it is necessary to add some proper vehicle to facilitate the operation, as otherwise it will be found difficult to spread it with the heated iron uniformly.

These facts I leave to your readers without comment, trusting that they possess sufficient interest to awaken curiosity and excite inquiry. It is within a comparatively recent period that the subject has attracted attention in Jamaica, and already the demand, although limited to the confines of the island, considerably exceeds the capability of supply. Before the expense of forming plantations shall have been incurred, the real value of the gum should be ascertained by careful and repeated observation,

and when the certainty of a market shall have been placed beyond doubt, a sufficiency of supply will follow as a matter of course. Under such circumstances, it is to be hoped that any Member of the Society who may be fortunate enough to obtain a sufficient supply for extensive experiment, will prosecute his researches with diligence, and communicate to the world the result of his investigations.

14, *Octagon, Plymouth.*

CHLOROFORM

AN ANÆSTHETIC AGENT AS A SUBSTITUTE FOR SULPHURIC ETHER.

We have before us a pamphlet by Dr. Simpson, of Edinburgh, recommending the use of chloroform for inhalation in surgical operations. In a former number (vol. vi., page 357) we mentioned the fact that chloric ether, or ter-chloride of carbon, might be used as a substitute for sulphuric ether, and this had been tried with success at some of the hospitals. It was found to be more agreeable to the taste than sulphuric ether, and less apt to produce coughing, and irritation of the organs of respiration. In other respects the operation of the two agents corresponded, and we have repeatedly administered them together. The introduction of a sulphuric ether, more pure and light than that which had previously been supplied by the manufacturers, removed the chief inconvenience which had been found to attend its inhalation, and this being less expensive than the chloric ether, the use of the latter was in a great measure discontinued, until Dr. Simpson re-introduced the same agent in a more concentrated form, chloroform bearing the same relation to chloric ether that sweet spirits of nitre does to pure nitric ether.

The result of Dr. Simpson's experiments has led him to the conclusion that chloroform possesses the following advantages:—

1. A greatly less quantity of chloroform than of sulphuric ether is requisite to produce the desired effect; usually from 100 to 120 drops being sufficient, and sometimes much less.

2. Its action is more rapid and complete, and generally more persistent. From ten to twenty inspirations generally suffice. Thus the preliminary exciting stage observable in the administration of ether is avoided.

3. Chloroform is more agreeable than ether.

4. Considering the small quantity used, it will probably be less expensive.

5. The odour is not unpleasant, nor is it so permanent as that of sulphuric ether.

6. From its small bulk it is more portable.

7. No apparatus is necessary for its inhalation; a small hollow-shaped sponge or handkerchief answering the purpose.

Dr. Simpson recites several cases in which chloroform has been exhibited with marked success in the extraction of teeth and other operations. These reports so closely resemble those which have been frequently published respecting operations under sulphuric ether, that it is needless to recapitulate them. The only difference appears to be that in Dr. Simpson's experience the action of the chloroform is more speedily produced and more complete, while its subsequent effect is less depressing and more evanescent.

Dr. Simpson gives the following account of the

CHEMICAL CONSTITUTION OF CHLOROFORM.

Formyle is the hypothetical radical of formic acid. In the red ant (*Formica rufa*) formic acid was first discovered, and hence its name. Gehlen pointed it out as a peculiar acid; and it was afterwards first artificially prepared by Doebereiner. Chemists have now devised a variety of processes, by which formic acid may be obtained from starch, sugar, and, indeed, most other vegetable substances.

A series of chlorides of formyle are produced when chlorine and the hypochlorites are brought to act on the chloride, oxide, and hydrated oxide of methyle (pyroxylic or wood spirit). In the same way as formic acid may be artificially procured from substances which do not contain formyle ready formed,—so also are the chlorides of this radical capable of being procured from substances which do not originally contain it.

Chloroform, chloroformyle, or the perchloride of formyle, may be made and obtained artificially by various processes,—as by making milk of lime, or an aqueous solution of caustic alkali act upon chloral,—by distilling alcohol, pyroxylic spirit, or acetone, with chloride of lime,—by leading a stream of chlorine gas into a solution of caustic potass in spirit of wine, &c. The preparation which I have employed was made according to the following formula of Dumas:—

"℞ Chloride of lime in powder	.....	℔. iv.
Water	.....	℔. xii.
Rectified Spirit	.....	f℥xii.

"Mix in a capacious retort or still, and distil as long as a dense liquid, which sinks in the water with which it comes over, is produced."—*Gray's Supplement to the Pharmacopœia*, 1847, p. 633).

The resulting perchloride of formyle consists of two atoms of carbon, one of hydrogen, and three of chlorine. Its specific gravity is much greater than that of water, being as high as 1·480. It boils at 141°. The density of its vapour is 4.2. It is not inflammable, nor changed by distillation with potassium, potash, sulphuric, or other acids.

It is now well ascertained that three compound chemical bodies possess, when inhaled into the lungs, the power of superinducing a state of anæsthesia, or insensibility to pain in surgical operations, &c., namely, nitrous oxide, sulphuric ether, and perchloride of formyle. The following tabular view shows that these agents are entirely different from each other in their chemical constitution, and hence that their elementary composition affords no apparent clue to the explanation of their anæsthetic properties:—

	Propor. of Nitrogen.	Propor. of Oxygen.	Propor. of Carbon.	Propor. of Hydrogen.	Propor. of Chlorine.
Nitrous Oxide,	1 Atom.	1 Atom	...	...	...
Sulphuric Ether,	...	1 Atom.	4 Atoms.	5 Atoms.	...
Chloroform,	...	...	2 Atoms.	1 Atom.	3 Atoms.

It is, perhaps, not unworthy of remark, that when Soubeiran, Liebig, and Dumas engaged, a few years back, in those inquiries and experiments by which the formation and composition of chloroform was first discovered, their sole and only object was the investigation of a point in philosophical chemistry. They laboured for the pure love and extension of knowledge. They had no idea that the substance to which they called the attention of their chemical brethren could or would be turned to any *practical* purpose, or that it possessed any physiological or therapeutic effects upon the animal economy. I mention this to show, that the *cui bono* argument against philosophical investigations, on the ground that there may be at first no apparent practical benefit to be derived from them, has been amply refuted in this, as it has been in many other instances. For I feel assured, that the use of chloroform will soon entirely supersede the use of ether; and, from the facility and rapidity of its exhibition, it will be employed as an anæsthetic agent in many cases, and under many circumstances, in which ether would never have been had recourse to. Here then we have a substance which, in the first instance, was merely interesting as a matter of scientific curiosity and research, becoming rapidly an object of intense importance, as an agent by which human suffering and agony may be annulled and abolished, under some of the most trying circumstances in which human nature is ever placed.

In confirmation of the remark that the elementary constitution of the three known anæsthetic agents affords no explanation of the theory of their action, we may mention another circumstance, namely, that while it is currently stated, and we believe on good grounds, that the presence of a very small proportion of alcohol in sulphuric ether occasions so much irritation as to render it improper for inhalation, the chloric ether, which consists of chloroform, with above 80 per cent. of alcohol, produces little or no irritation, and was originally preferred to sulphuric ether partly on this account.

As it is likely that chloroform will be extensively used, it is particularly desirable that uniformity in its constitution should be observed. Time and experience will probably bring it to a moderate cost, and insure to the public the advantage of a uniform preparation. We have received a communication from Mr. Morson, and another from Mr. Hooper, each of which contains a caution on this subject, pointing out the importance of distinguishing between chloroform and chloric ether. The great specific gravity of chloroform, and its insolubility in water, are mentioned as characteristic tests, to which we may add, that it is a body very difficult of ignition, which will readily distinguish it from chloric ether.

ELLERMAN'S DEODORIZING FLUID.

The increased public attention which has recently been directed to the improvement of the sanitary condition of populous neighbourhoods, has led to the suggestion of several plans, previously unknown or but little regarded, for promoting these objects. We have had occasion lately to notice two compounds which were represented to possess the power of destroying contagion, together with its concomitant association of obnoxious odours. There is now another compound, which is ushered forth under a less assuming title than those adopted in the other cases alluded to, and on this account we should be disposed to anticipate a more complete realization of its pretensions.

Ellerman's Deodorizing Fluid is proposed to be used for destroying the offensive smell of nightsoil, and other similar decomposing animal and vegetable matter, thus cutting off some of the most fruitful sources of those effluvia which often render the vicinities of cesspools, drains, sewers, and other reservoirs of excrementitious and putrescent matter, at once obnoxious to the senses and to the health of the inhabitants.

Several public exhibitions of the effects of this fluid have been made in different localities about London, of which notices have appeared in the public papers.

One of the first of these demonstrations occurred in the early part of last month, at Hackney, before the Directors of the Poor of that parish, and several medical and scientific men of the district. Mr. Redwood attended on behalf of this Journal, and after witnessing the effects of the fluid on a quantity of nightsoil, proposed a more specific means of testing its efficacy by applying it to several odorous gases, which are the products of animal and vegetable decomposition. This proposition was readily assented to by Mr. Ellerman, who evinced a very praiseworthy disposition to submit his compound to a full and fair test of its efficacy. The examination was accordingly renewed on the following day, when Mr. Fordred, of Hackney, rendered his assistance, and furnished some of Ledoyen's, Sir William Burnett's, and Labarraque's fluids, for comparison with Ellerman's. The result of this investigation went to show, that although each of the four liquids mentioned, when added to nightsoil in the state in which it is collected by the nightmen, destroyed to a great extent its offensive smell, yet there was a marked difference in the effects severally produced. The odour was most completely destroyed by Ellerman's fluid and by Labarraque's chloride of lime. In the case of the former of these two, however, it was found, when added to the extent of one or two per cent., that in addition to its almost completely deodorizing the previously

offensive matter, it at the same time changed it from a semi-fluid to a thick and almost solid state.

It appeared that all the compounds mentioned effected the decomposition of sulphuretted hydrogen and sulphuret of ammonium; that none of them produced any immediate effect on bisulphuret of carbon or carburetted hydrogen; and that one only, namely Ledoyen's fluid, produced any sensible effect in destroying the odour of phosphuretted hydrogen, and even this was but partial.

On the whole, the result of the experiments was thought, by the gentlemen present, to prove that Mr. Ellerman's fluid was capable of fulfilling satisfactorily the specific objects proposed—namely, the destruction of the offensive odour of night-soil and other similar matter, the preservation of those constituents of the decomposing matter which, during the generation of noxious gases, are dissipated in the air, and the improvement, by this means, of the resulting compound as a fertilizing agent for agricultural purposes.

Without, therefore, touching upon the disputed points relating to the nature and cause of miasma and contagion, or pretending to effect objects which are incomprehensible, Mr. Ellerman has, we think wisely, directed his efforts to the abatement of a prevailing and tangible nuisance; and if, by the use of his deodorizing fluid, he can disarm cesspools, drains, sewers, &c., of their obnoxious effluvia, at a very moderate expense, rendering their contents so slightly offensive that they may be carted, collected, dried, prepared, and used as a valuable manure, without creating a nuisance to all surrounding inhabitants, he will certainly effect a great practical improvement.

Mr. Ellerman has taken out a patent for his fluid, and, until the specification of the Patent has been completed, he does not make public its exact composition; but we have ascertained that it owes its efficacy principally to the presence of a persalt of iron, which is produced at a very slight cost.

IMPROVEMENTS IN THE PROCESS OF MANUFACTURING GAS.

The progress of science and the stimulus of competition have been instrumental in effecting so great an improvement in the quality as well as in the economy of gas, that we now receive at the rate of seven shillings a thousand cubic feet, a gas of much greater purity and illuminating power than that which, a few years ago, was supplied at seventeen shillings. There is every reason to believe that further improvements will be effected, as several new companies are in progress of formation, all holding out to the public their respective claims to confidence and support, on the ground of their undertaking to supply

a superior article at a reduced price. Among these aspirants we may mention the Western Gas-light Company, whose works are in course of construction at Kensall Green, who undertake to furnish a gas from Cannel coal, possessing an illuminating power 75 per cent. greater than that of ordinary gas, and free from the usual impurities.

The process adopted by the Western Gas Company is that which has recently been patented by Mr. G. H. Palmer. The specification (dated Oct. 17, 1847), describes the construction of furnaces said to be calculated to insure an equable temperature with tubes called regenerators, passing through the upper part of the furnaces, by means of which the gas is exposed to a dull red heat during its passage from the retort to the condenser. These regenerators contain a quantity of metallic chippings or loose plates of iron, the object of which is to increase the heated surface over which the crude gas passes. This part of the process is intended to deprive the gas of sulphur and some other impurities, and to increase its bulk and illuminating power. For its further purification it is made to pass through a "mechanical precipitator and cooling apparatus," in which a revolving fan keeps it in constant agitation, and causes the deposition of the tar and naphtha which runs out below. It next passes into "filtering towers," in which jets of liquid ammonia are thrown into it; after which it is introduced into a vessel in contact with steam at a high temperature, with which it is mechanically mixed. The mixture of gas and steam then introduced into a refrigerator or condenser, and the operation of steaming and condensing is repeated until all the condensible materials in the gas are separated. In addition to the above manipulation, the gas is also subjected to the usual purification with lime, in which Mr. Palmer describes an improvement, namely, the introduction of a blast of air prior to the removal of the refuse lime from the apparatus. Lastly, the specification describes a process for naphthalizing or denaphthalizing the gas by the introduction of naphtha or fixed oils into an apparatus resembling that which is used for treating the gas with liquid ammonia.

Among other testimony in favour of their process and its result, the directors of the Western Gas Company have furnished the St. Marylebone vestry with a copy of a report from Dr. Leeson, Professor Miller, and Mr. W. J. Hay, who have, on behalf of the Company, inspected a temporary apparatus erected for the purpose at Vauxhall, and analysed the gas.

This report speaks favourably of the process as being efficient, convenient, and free from the effluvia and other nuisances attending gas-works in general.

The gas is described as possessing a greater specific gravity than that of ordinary gas (in the proportion of 632 to 400) and an illuminating power considerably superior, four cubic feet of the patent gas when burnt giving a light equal to seven cubic feet of ordinary gas. It is also stated to be unusually pure, containing no sulphuretted hydrogen, no ammonia, and no carbonic acid. Such are the advantages offered to the public by the new Company, and we have no hesitation in saying that if the managers can and will realize all that they have promised, much benefit will arise from the competition.

It must not be understood, however, that the process described in the specification of the patent is altogether a novelty. Mr. Palmer himself,

in the year 1818, took out a patent, comprising in principle the main feature of his present process. A similar process was also patented by Mr. Down in 1832, and also, with some unimportant modification, by Mr. Malam in 1835. We have before us a plan and description of Mr. Malam's regenerators and furnace, which appear to be precisely identical with those described in Mr. Palmer's recent specification. Mr. Grafton took out a similar patent in 1841. The regenerators are condemned by the most experienced gas manufacturers, as it is found that the gas is injured by this additional heating, the increase in volume being effected at the expense of its illuminating power. The mechanical precipitator is in principle equivalent to Lowe's patent scrubber, now used by the Chartered Gas Company. The steaming, condensing, and naphthalizing processes are adopted at the gas-works in Brick Lane, having been patented by Mr. Lowe in 1832. The blast of air claimed by Mr. Palmer was introduced some years ago in Hull by Mr. Malam. The process of naphthalizing gas has long been known and employed. Some years ago, it was described at one of the Friday evening meetings at the Royal Institution. We must therefore throw aside the impression that the advantages of Mr. Palmer's patent are confined to the works of the Western Gas Company, the most important parts of the process being already either employed at other works, or superseded by modifications answering the same purpose.

The chemical certificate must not be received as conclusive evidence of the uniform superiority of the gas to be furnished by the new Company, for this certificate states, that "the gas furnished by different companies varies generally in illuminating power, as does that supplied by the same company at different times." It is well known, however, that one of the main difficulties in the manufacture of gas consists in the production of an equable and uniform product, the result being affected by variations in the temperature employed, and by other circumstances connected with the manipulation. The certificate, therefore, may be taken as evidence of the value and purity of a sample of gas produced for the express purpose of examination; further than this no dependance can be placed on it. The illuminating power of gas depends, in a great measure, on the proportion of carbon it contains, and its purity can be effected by various processes well known and often practised. It would be easy for any company to furnish, from ordinary coal, a sample of gas equal in every respect to that above described. It remains to be shown whether any company will continue to bestow the same care and expense on the manipulation after having gained a footing.

If sanguine reports and tempting promises could be taken as evidence, we might congratulate the public on the birth of a Company which throws all its predecessors into the shade. It is styled "The Cardinal and Central Gas Light-Ventilation, Animal Charcoal, and Carbonaceous Manure Company," and is about to shed its light upon the metropolis. Mr. Radley, the engineer, undertakes on behalf of this Company to supply a "better gas than that of the Western Gas Company at a maximum of four shillings a thousand cubic feet," and offers to guarantee, if encouraged by the parochial authorities, that "the price for gas, after the lapse of five years, will not exceed three shillings per thousand cubic feet!"

The public advantages of a fair and free competition are universally

admitted, and on this ground it would appear desirable at once to encourage the advances of new companies. But in the present instance, it is requisite, as a prudent precaution, to institute a comparison between the respective claims of the several competitors to public *confidence*, before permission is given to any of them to inflict upon the public the inconvenience attending the opening of the ground in every street in which it may be proposed to lay down the pipes. This licence certainly ought not to be granted unless with a well-grounded prospect of future benefit.

ON ACETIC ACID.

BY ANDREW URE, M.D., F.R.S.

Acetic acid, or, according to the new nomenclature of Organic Chemistry, *acetylic acid-hydrate*; being a compound of the radical acetyl ($Ac = C_4 H_3$) and oxygen (O_3) with water H O; for it cannot be obtained in the dry state. It is formed out of alcohol in the acetous fermentation, or by its oxygenation with air; it is produced in the dry distillation of most non-volatile organic compounds, as of wood, gum, starch, &c., in the spontaneous decomposition of the watery solutions of citric and tartaric acids, as also by the boiling of several organic substances with sulphuric acid. It exists ready formed in several vegetable and animal juices.

Alcohol is a compound, which even diluted with water and exposed to the air, is not liable to spontaneous change, but if in this state it is mixed with yeast, at a temperature of from 60° to 90° Fahr., it absorbs oxygen, and passes into acetic acid. The oxygen forms first water, with two atoms of the hydrogen of the ethyl, whereby acetyl is generated; therefore ethyloxide hydrate (alcohol) becomes acetyloxide hydrate (aldehyde) which by absorption of two more atoms of oxygen constitutes hydrated acetic acid

1 Atom Alcohol =	$C_4 H_5 O + H O$.
— 2 Atoms Hydrogen =	H_2
= Aldehyde	$C_4 H_3 O + H O$.
+ 2 Atoms Oxygen...	O_2
= 1 Acetic acid Hyd.	$C_4 H_3 O_3 + H O$.

Its atomic weight on the hydrogen scale is therefore 60 in the state of hydrate, and 51 dry.

Albumen, gluten, and vegetable matters which contain these substances, such as the juice of beet-roots, operate also the oxidation of alcohol, and that the more rapidly, the more ample the exposure of the mixture to the air. While sugar is transmuted into carbonic acid and alcohol only through the intervention of gluten, alcohol suffers that change by contact with finely-divided platinum. It is hence probable, that to what is called acetous fermentation the vital action of the particles of yeast is not indispensable, and that it belongs rather to the category of chemical combustions; *to the contact action of Liebig, the catalysis of Berzelius*, or the *polar combination of Löwig*.

In the vinegar of wine, malt, or that in which organic matter has been infused, there appears a peculiar mould-plant, belonging to the

genus *Mycoderma Pers.*, which is usually called *vinegar-mother*. As the plant grows, it decomposes the acid, and leaves eventually nothing but water. It contains proteine, and consequently azote, but leaves no ashes when burned.

The same circumstances which govern the conversion of alcohol into vinegar, preside over that of wood-spirit into formic acid (acid of ants), fusel oil (oil of grain) into valerianic acid; and probably butyric acid has some such origin. With regard to the formation of vinegar, M. Dumas observes that every fermentation has for its effect to dissociate a compound into a more simple state; but the so-called acetous fermentation unites alcohol or aldehyde with the oxygen of the air; being the only case in which fermentation represents a true combustion. He admits, notwithstanding, that this fermentation in a certain point of view possesses the characters of the other fermentative actions, namely, the concourse of an organized substance, and of an organic matter; the one being a ferment (the mother) and the other fermentable. The conversion of alcohol into vinegar never happens in common cases without the aid of an albuminous substance, and of circumstances favourable to all fermentations, such as the presence of air, not only at its commencement but during its entire course.

The lactic fermentation has however been sometimes mistaken for the acetous; but it may be distinguished by its requiring no alcohol; but only starchy or saccharine matters; and after it begins, exposure to air is not needed. It has been supposed that acetification is analogous to nitrification, as to the utility of porous bodies which divide the liquid and the air; thus ammonia passed along with air through platinum sponge gently ignited in a tube, produces nitric acid; and pumice-stone in like circumstances combines sulphurous acid and oxygen into the sulphuric; and so we have seen that a mixture of alcohol vapour and air under the influence of the same sponge, is converted by a true oxidation of the ether (of the alcohol) first into aldehyde and afterwards into acetic acid. A like oxidation takes place in the wine or beer, which being purposely left in casks partially filled rises by capillarity on the wood above the liquid level, and is there subjected to the porous influence. The vinegar is much more rapidly generated, however, by the various artificial methods of multiplication of points of contact with the air presently to be described.

Vinegars may be arranged under four heads: 1. Malt or sugar vinegar; 2. Wine and fruit vinegar; 3. Alcohol vinegar; 4. Wood vinegar.

1. Malt vinegar is manufactured most extensively in the United Kingdom, chiefly in England, to the amount of fully 3,000,000 of gallons, on which an excise duty of twopence per gallon is levied, and for the licence to manufacture it five pounds annually must be paid. The total number of vinegar manufactories in this country is about fifty; of which five of the principal ones are in London, and these carry on at the same time the manufacture of British Wines, now happily emancipated from the trammels of the Excise. From six bushels of malt properly crushed, 100 gallons of wort in whole may be extracted by due mashing; the first water of infusion being of the temperature of 160° Fahr. and the next two progressively hotter, for exhausting the soluble saccharine matter. When the wort is cooled to 75°, from three to four gallons of good yeast are stirred into it in the fermenting tun, and when it has been in brisk fermentation for about

forty hours, it is racked off into used vinegar-casks, laid upon their sides in a room heated with a stove for quick work, or otherwise during summer in the open air, under exposure to the sun. The casks should be only about three-fourths filled, and left unclosed, or loosely covered from the rain at their bung-holes, to favour the free acidifying action of the atmosphere. In the air the acetic fermentation may not be completed till after the lapse of three months; but in stove-rooms in much shorter time, according to the temperature. The sour liquor is then transferred from the several casks by means of a flexible pipe and pump into the stove-vat, whence it is run into the clarifying and flavouring casks, called "rapes," being here made to filter slowly and repeatedly through condensed heaps of the stalks and skins of raisins, called rape, which is the refuse of the British wine manufacture. Vinegar thus made contains always a considerable quantity of gluten, and is therefore liable to become mouldy and to putrify; to counteract which a certain portion of sulphuric acid may be legally, and is always, mixed with British-made vinegar; but that portion is too often overpassed through avarice, and is certainly injurious to health. I have found by analysis in a sample of vinegar made by one of the most eminent London manufacturers, with which he supplies the public, no less than 175 grains of the strongest oil of vitriol per gallon added to vinegar containing only 3 and 6-10ths per cent. of real acetic acid; giving it an apparent strength after all of only 4 per cent.; whereas standard commercial vinegar is rated at 5 per cent.

It is a remarkable fact, that the people of this country have had their vinegar palate so depraved, that they prefer the vitriolized vinegar to the pure, and that all attempts at introducing a better article into general sale has proved abortive—a fact discreditable to our nation, of which several instances have come before me. *(For the analysis of vinegar see the end of this Article.)*

The complete acidification of malt wort by the above process being very slow, has given rise to many projects, more or less successful, for accelerating it. So long ago as the year 1824, Mr. Ham, of Norwich, obtained a patent for exposing worts to the atmospheric air upon a most extensive surface, by means of a revolving pump, which caused a constant shower of it to fall upon and through a bundle of birch twigs, supported in the middle of a large tun. The air had free access to the twigs. The wash, being kept at a temperature of from 90° to 100° Fahr., by steam-pipes at the bottom of the tun, and continually repumped, became moderately acetified in 48 hours, and was finished into good vinegar, either by that process, or preferably by racking off into casks, and exposing it in them to a temperature of 85° Fahr., for fifteen or twenty days. He also found that a wort, made with one part of malt mixed with six of raw barley, properly mashed, afforded by this means an excellent vinegar. A wort of specific gravity 1.060 (60 excise gravity) will yield a vinegar of revenue proof, or of five per cent. real acetic acid. This quick process belongs rather to the combustion class of chemical transformations than to that of the fermentative, as yeast is not essential, though it is found to prove serviceable, as in the corresponding formation of acetic acid from the oxygenation of alcohol some stale vinegar is used as a ferment, or as a contact agent.

An excellent vinegar may be made for domestic purposes, by adding to a syrup consisting of one pound and a quarter of sugar for every

gallon of water, a quarter of a pint of good yeast. The liquor being maintained at a heat of from 75° to 80° Fah., acetification will proceed so well, that in two or three days it may be racked off from the sediment into the ripening cask, where it is to be mixed with one ounce of cream of tartar, and one ounce of crushed raisins. When completely freed from the sweet taste, it should be drawn off clear into bottles, and closely corked up. The juices of currants, gooseberries, and many other indigenous fruits, may be acetified either alone, or in combination with syrup. Vinegar made by the above process from sugar, should have fully the revenue strength. It will keep much better than malt vinegar, on account of the absence of gluten, and at the present low price of sugar, will not cost more, when fined upon beech chips, than one shilling per gallon.

[*To be continued.*]

ON THE DETECTION OF ADULTERATIONS OF CANE-SUGAR SYRUP.

If a boiling-hot saturated solution of bichromate of potash be added to a consistent syrup of cane-sugar, and the mixture heated to the boiling-point, a violent re-action takes place, which continues even after the removal of the vessel from the fire, the chromic acid is reduced, and the liquid becomes green in consequence of the oxide of chromium dissolved therein. If syrup from starch be treated in the same manner, a different result is obtained, which may serve to distinguish the two sorts of sugar from one another. The syrup from starch is not affected by the super-chromate of potash, and if added to syrup of cane-sugar in the proportion of one-third to one-eighth, it even prevents the re-action of the latter. The mixture only foams a little more when heated, but does not change colour. If the proportion of starch syrup be less, a change of colour may indeed take place, accompanied by an inconsiderable re-action, but never so distinct as in the case of cane-sugar syrup. Although the syrup can be thus distinguished, cane-sugar and starch-sugar cannot be distinguished from one another by the test by chromate of potash, because the latter effects no re-action in concentrated solutions of either. By means of nitrate of cobalt, however, we can distingnish these two kinds of sugar. If to a concentrated solution of pure cane-sngar some potash be added, and the whole heated to boiling, a blue-violet precipitate is obtained, even if the solution be diluted, upon the addition of a few drops of a solution of nitrate of cobalt. A diluted solution of starch-sugar, treated in this way, gives no precipitate, and a concentrated solution yields only a dirty-brown precipitate. A small proportion of starch-sugar, contained in cane-sugar, prevents the appearance of the violet-blue precipitate.

Herzog confirms these statements, and adds, that beet-root syrup reacts upon the bichromate of potash as energetically as cane-sugar syrup does. The liquid, however, does not become green, but retains its colour, as in starch syrup. In a mixture of cane-sugar syrup and beet-root syrup, a greater quantity of the latter must be contained to prevent the formation of the green colour caused by the first. Herzog likewise confirms Reich's method of testing grape-sugar and cane-sugar by nitrate of cobalt. Beet-root-sugar and mannite mixed with potash, yield, according to Herzog, the same precipitate with a cobaltic solution as cane-sugar. Sugar of milk prevents the precipitation of the nitrate of cobalt by potash the same as grape-sugar. He mentions at the same time that mannite boiled with sulphate of copper and potash does not immediately reduce the oxide of copper. Pure mannite free from grape-sugar does not possess this quality.—*Ed. of Pharm. Central Blatt,* Sept. 22, 1847.

ON THE COLOURING MATTER OF RED SANDERS WOOD.

BY DR. P. BOLLEY.

Some time since I undertook to examine this colouring matter, under the idea that it was related to dragon's blood, an idea which, besides other reasons, suggested itself to me by the very similar analytical results which Pelletier obtained from santalin, and Johnston from the dragon's blood.

	Santalin. Pelletier.		*Dragon's Blood.* Johnston.
Carbon	75.08	...	74.247
Hydrogen	6.37	...	6.450

But I soon perceived that my supposition was erroneous, for, according to my analysis, the elementary composition of the two red pigments differed still more than the above numbers show.

Upon continuing my experiments, I found the composition of this pigment to be quite different from that mentioned by Pelletier; nor can I subscribe to what Preisser says about the reducibility and decolorization of this pigment. By treating the compound of oxide of lead and this pigment, suspended in water, with sulphuretted hydrogen, and filtering the watery fluid, I found in the latter only some traces of the pigment. When the lead precipitate of this pigment contained some adhering spirit of wine, a slight quantity of the pigment was carried through the filter; but independent of this I obtained nothing but water. On the other hand, when the sulphuret of lead on the filter was treated with spirit of wine, I obtained an intensely red solution.

In my experiments I employed, first, the internal pieces of red sanders, the stems of which were rather pale ; and, second, a dark sort, of the same colour as the sanders wood generally found in commerce.

The first sort was treated in a twofold manner for obtaining a pure pigment: first, the colouring matter was extracted by spirit of wine, the greater portion of which was removed from the extract by evaporation, and the pigment precipitated by water; secondly, caustic potash was used for extracting the pigment, and muriatic acid for forming the precipitate: the latter was washed again, mixed with spirit of wine, and then precipitated by water. Before the analysis was made, the precipitates were kept for a long time in the heat of boiling water, as they retained obstinately the spirit of wine, which the smell betrayed.

The mean of the results of the three sorts of analyzed substances is:—

	Spirituous extract of the pale sort.	Spirituous extract, precipitated by water, of the dark sort.	The extract of the paler sort obtained by alkali, muriatic acid, &c.
Carbon	67.19	65.73	64.45
Hydrogen	5.84	5.49	5.07
Oxygen	26.97	28.78	30.48

From this it is obvious, that a decrease of carbon and hydrogen takes place at the expense of the increased oxygen. The darker sort, therefore, is a higher oxydized substance, and the treatment of the lighter sort with alkali had caused an increase of oxygen.

I did not succeed in fixing the equivalent of the substance by producing a combination with oxide of lead, as I could not obtain a precipitate of stable composition.

ECONOMY IN LAMP OIL.

Prepare a saturated solution of common salt in water, taking care that no salt remains at the bottom of the vessel. Then soak the wick therein, and afterwards thoroughly dry it. Mix equal parts of oil and of this solution—shake them well together for some time—then allow the saline solution to subside, and pour off the oil. The wick, thus prepared, burns exceedingly bright, while the oil does not smoke, and is not so quickly consumed as unprepared oil.—*Buchner's Repertorium*, Bd. xlvi.

THE TALLOW TREE.

The tallow tree (*Stillingia sebifera*) is abundant in the valleys of Chusan, and large quantities of tallow and oil are yearly extracted from its seeds: tallow-mills are erected in several parts of the island for this purpose.

For the following account of the Chinese method of extracting the tallow from the seeds of the *Stillingia sebifera* I am indebted to Dr. Rawes, of the Madras army, who was some time resident in the island of Chusan:—

METHOD OF OBTAINING THE TALLOW.

"The seeds are picked at the commencement of the cold weather, in November and December, when all the leaves have fallen from the trees,—this I saw at Singkong when out shooting in the Sah-hoo valley, close by our quarters, through the village. The seeds are in the first place taken to the building where the process of making the tallow is carried on, and picked and separated from the stalks. They are then put into a wooden cylinder, open at top, but with a perforated bottom. This is placed over an iron vessel (about the same diameter or rather larger than the wooden cylinder, and about six or eight inches deep) containing water, by which means the seeds are well steamed, for the purpose of softening the tallow and causing it more readily to separate. The furnace I saw had four or five iron vessels in a row, was about three feet high, four or five feet broad, and eight or ten feet long. The fire was placed at one end and fed with the husk of the rice, dry grass, and such like cheap materials which make a great flame, and the flue was of course carried directly under the whole of the iron vessels.

"When the seeds have steamed ten minutes or a quarter of an hour, they are thrown into a large stone mortar, and are gently beaten by two men with stone mallets for the purpose of detaching the tallow from the other parts of the seed. They are then thrown upon a sieve, heated over the fire, and sifted, by which process the tallow is separated, or nearly so, although they generally undergo the process of steaming, &c. a second time, that nothing may be lost. The other part of the seed is ground and pressed for oil.

"The tallow now resembles coarse linseed meal, but with more white spots in it, and derives its brown colour from the thin covering over the seed (between it and the tallow) which is separated by the pounding and sifting. In this state it is put between circles of twisted straw, five or six of which are laid upon each other, and thus forming a hollow cylinder for its reception. When this straw cylinder (we may call it so) has been filled, it is carried away and placed in the press, which is a very rude and simple contrivance, but which, like everything Chinese, answers the purpose remarkably well. The press consists of longitudinal beams of con-

siderable thickness, placed about a foot and a half, or two feet asunder, with a thick plank at the bottom, forming a kind of trough, and the whole is bound together with iron. The tallow is pressed out by means of wedges driven in very tightly with stone mallets, and passes through a hole in the bottom of the press into a tub, which is sunk there to receive it. It is now freed from all impurities, and is a semifluid of a beautiful white colour, but soon gets solid, and in cold weather is very brittle. The inside of the tubs which collect the tallow are sprinkled or dusted over, with a fine red earth, well dried, which prevents the tallow from adhering to their sides. It is thus easily removed in a solid state from the tubs, and in this condition the cakes are exposed for sale in the market. As the candles made from this vegetable tallow have a tendency to get soft and to melt in hot weather, they are commonly dipped in wax of various colours, as red, green, and yellow. Those which are intended for religious purposes are generally very large, and finely ornamented with golden characters.

"The cake, or refuse, which remains after the tallow has been pressed out of it, is used for fuel, or to manure the land, and so is the refuse from the other part of the seeds from which oil is extracted."—*Fortune's Wanderings in China.*

OPIUM SMUGGLING.

The statements which have been frequently made in England, both as regards the smuggling and the smoking of opium, are very much exaggerated. When I first went to China, I expected to find those merchants who were engaged in this trade little else than armed buccaneers, indeed, if I do not mistake, they have been represented as characters of this kind on the English stage. Instead of this, the trade is conducted by men of the highest respectability, possessed of immense capital, and who are known and esteemed as merchants of the first class in every part of the civilized world. The trade in opium, although contraband, is so unlike what is generally called smuggling, that people at a distance are deceived by the term. It may be quite true that its introduction and use are prohibited by the Chinese government; but that prohibition is merely an empty sound, which, in fact, means nothing. The whole, or at least the greater part of the mandarins use it, and it is not at all unlikely that his Celestial Majesty himself makes one of the number of its devotees. The truth is, the Chinese government, whatever it may say, has no wish to put a stop to its introduction It is necessary, however, to publish every now and then strong threatening edicts against it, which are only consigned to oblivion in the pages of the Peking Gazette, and have no effect whatever in restraining the Emperor's loyal subjects. It is now the opinion of all intelligent foreigners, and also many of the more enlightened amongst the Chinese themselves, that the importation of opium ought to be legalised, and it should be admitted at a small duty, as, by this means, much of the demoralising effects of smuggling would be got rid of, and a considerable revenue would flow into the coffers of the Chinese treasury.

Many instances of the feeble kind of opposition which the Chinese government employ to stop the opium trade, occurred during my residence in the country. Sometimes an admiral, renowned for his valour, was sent with a number of war-junks to a particular station, where the opium ships were anchored, for the purpose of compelling them to leave the Chinese shores. Gongs were beat, guns were fired, at a respectful distance however, and the junks came down with all that pomp and parade which the Chinese know so well how to assume, and which seem to form a principal

part of their warlike operations. In the mean time the little opium vessels were seen quietly at anchor, apparently paying but slight attention to all these threatening demonstrations. Presently a message was sent from the admiral, ordering them to get up their anchors and stand out to sea, and never more to dare to enter the waters of his Celestial Majesty under the penalty of being completely annihilated.

A summons like this in former days might have had some weight, but now it had none ; and the only answer the messengers carried back was, "that the foreign vessels were well armed, and that they would not leave their anchorage." This was quite sufficient to cool the courage of the admiral, who was now in a dilemma ; he durst not fight the "barbarians," and if he did not manage to get them out of the way, his character for courage would suffer when the affair was represented at head-quarters. He therefore altered his tone, and *requested* the captains, as a great favour, to leave the anchorage and move outside for a day or two only, after which time they might return to their old quarters. This was agreed to on the part of the captains of the opium vessels, and on the following morning they got under weigh and went out to sea. The Chinese, who were on the look-out at the time, made a great noise by beating gongs and firing guns, and followed the opium ships until they were fairly outside. The admiral now, sent up a report to his government to the effect that he had fought a great battle with the "barbarians," and had driven them away from the shores ; or very probably he said that he had blown some of their vessels to pieces, and sunk the rest in the depths of the sea. In the mean time, even before the report was half-way to Peking, the opium vessels had quietly taken up their old anchorage, and things were going on in the usual way! Such is a specimen of the way in which affairs are managed in China.—*Ibid.*

OPIUM USED IN CHINA.

The opium from Bengal, which consists of two kinds—namely, *Patna* and *Benares*—is always of a good quality and pure; but the Bombay *Malwa* is now so much mixed up with other ingredients, that the Chinese smuggler will not buy it until he has had an opportunity of testing its quality. This is done in the following manner:—having selected the chest or number of chests which he wishes to purchase, they are opened, and he takes out three or four of the worst-looking cakes, cuts a small piece from each, and dissolves them in a copper ladle over a charcoal fire. When the opium is melted, it is poured out into a coarse paper filter. If it is not of the worst description it readily passes through the paper into a small basin which is placed under it. When it will not pass through the filter, the Chinese call it *Man-ling* ; by which name they designate opium which is so bad, or so mixed with extraneous ingredients, that it will not dissolve in water or pass through the paper filter. This description of the drug is, of course, only bought at a very reduced price.

When the mixture passes through the filter, the paper is carefully examined, and if any sediment remains, such as sand or rubbish, with which the opium is frequently adulterated, it detracts considerably from its value. This filtered mixture is now put again into a clear copper pan, and boiled slowly over the charcoal fire, until the whole of the water is evaporated, and nothing remains but pure opium. The drug is then poured out into a small porcelain cup, and stirred round and examined with great care. At this stage of the process, colour forms the principal test of its quality, and

as the smuggler stirs it round, and holds it up to the light, he pronounces it to be "*tung-kow*," if it is thick like jelly ; "*pak-chat*," if it has a whitish colour ; "*hong-chat*," if it is red ; and "*kong-see-pak*," if it is opium of the first quality, or like that sent round by the East India Company.—*Ibid.*

OPIUM SMOKING.

Opium is prepared for smoking much in the same manner as I have described, and is kept in small cups, which are made for the purpose. The smoker lays his head upon a pillow, has a lamp by his side, and with a kind of needle he lifts a small portion of the opium to the candle, and having ignited it, he puts it into the small aperture of the bowl of the pipe. The candle is applied to the bowl during the process of inhaling, and the smoke is drawn into the lungs in the same manner as an Indian or Chinese swallows tobacco. A whiff or two is all that can be drawn from a single pipe, and, therefore, those who are accustomed to the use of the drug have frequently to renew the dose.

No one who has seen any thing of the habits of the Chinese will deny that the use of opium, particularly when taken to excess, has a most pernicious effect both upon the constitution and morals of its victims. From my own experience, however, I have no hesitation in saying that the number of persons who use it to excess has been very much exaggerated; it is quite true that a very large quantity of the drug is yearly imported from India, but then we must take into consideration the vast extent of the Chinese empire, and its population of 300,000,000 of people.* I have often been in company with opium-smokers when travelling in different parts of the country, and am consequently able to speak with some confidence with regard to their habits. I well remember the impressions I had on this subject before I left England, and my surprise when I was first in the company of an opium-smoker who was enjoying his favourite stimulant. When the man lay down upon the couch, and began to inhale the fumes of the opium, I observed him attentively, expecting in a minute or two to see him in his "third heaven of bliss;" but no: after he had taken a few whiffs he quietly resigned the pipe to one of his friends, and walked away to his business. Several others of the party did exactly the same. Since then I have often seen the drug used, and I can assert, that in the great majority of cases it was not immoderately indulged in. At the same time I am well aware that, like the use of ardent spirits in our own country, it is frequently carried to a most lamentable excess. Lord Jocelyn, in his "Campaign in China," gives the following account of its effects, which he witnessed upon the Chinese at Singapore :—"A few days of this fearful luxury, when taken to excess, will give a pallid and haggard look to the face, and a few months, or even weeks, will change the strong and healthy man into little better than an idiot skeleton. The pain they suffer when deprived of the drug after long habit, no language can explain; and it is only when to a certain degree under its influence that their faculties are alive. In the houses devoted to their ruin, these infatuated people may be seen at nine o'clock in the evening in all the different stages; some entering half distracted to feed the craving appetite they had been obliged to subdue during the day: others laughing and talking wildly under the effects of a first pipe; whilst the couches around are filled with their different occupants, who lie languid with an idiot smile upon their countenance, too much under the influence of the drug to care for passing events, and

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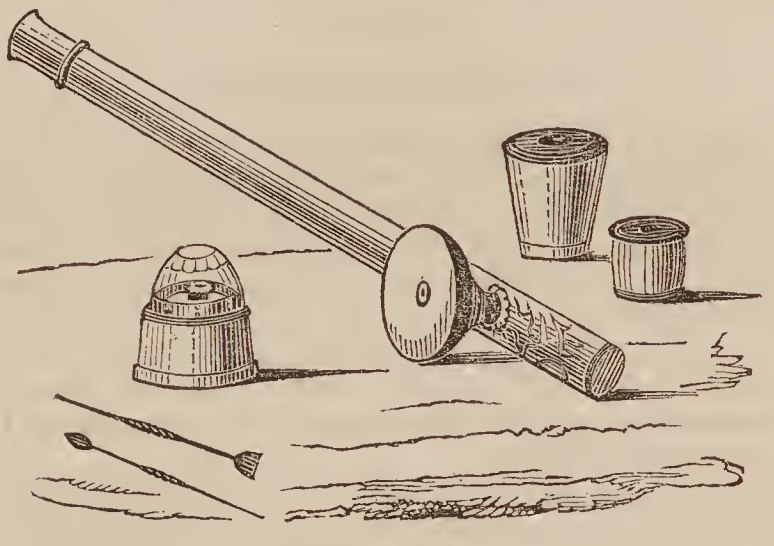
* The population of China has been estimated lately at 367,000,000.

fast merging to the wished-for consummation. The last scene in this tragic play is generally a room in the rear of the building, a species of dead-house, where lie stretched those who have passed into the state of bliss the opium-smoker madly seeks—an emblem of the long sleep he is blindly hurrying."—*Fortune's Wanderings in China.*



NIGHT-SOIL USED FOR MANURE IN CHINA.

For crops in a vigorous growing state no kind of manure is so eagerly sought after as night-soil; and every traveller in China has remarked the large cisterns or earthen tubs which are placed in the most conspicuous and convenient situations for the reception of this kind of manure. What would be considered an intolerable nuisance in every civilized town in Europe, is here looked upon by all classes, rich and poor, with the utmost complacency; and I am convinced that nothing would astonish a Chinaman more, than hearing any one complain of the stench which is continually rising from these manure-tanks. Almost every Chinese town is placed on the banks of a river or canal, and the water is generally led not only round the walls, thus forming a kind of moat, but also through many parts of the city. Long clumsy boats are placed in different departments of the town into which the night-soil and urine are emptied, and conveyed from thence into the country. The fields in the neighbourhood of cities are generally supplied with it by coolies, who go every morning to market loaded with the produce of their farms. Each brings home two buckets of this manure, slung at the ends of his bamboo pole. In England it is generally supposed that the Chinese carry the night-soil and urine to these tanks, and leave it there to undergo fermentation, before they apply it to the land. This, however, is not the case, at least not generally. In the fertile agricultural districts in the north, I have observed that the greater part of this stimulant is used in a fresh state, being of course sufficiently diluted with water before it is applied to the crops. And there can be little doubt that in this the Chinese are perfectly right, as the manure must be much more efficient in this state than when a great portion of its ammonia has passed off into the air. The Chinese, as far as I could learn, have no mode of disinfecting their manure, but they seemed to be perfectly aware, that if allowed free access to the air a great loss must result, owing to the gases which are given out and dissipated. Without waiting, then, for fermentation or putrefaction, this manure is at once applied to the growing crops. On the afternoons, or on cloudy days, the labourers are seen carrying water from the nearest pond or canal to the manure tank, for the purpose of diluting its contents. This being done, they fill their buckets, attaching one to each end of their bamboo in

the usual way, and carry them off to their destination. When this is reached, each man takes a small wooden ladle having a long bamboo handle, and with this he scatters the liquid over the growing crop. A strong stimulant like this would probably in other circumstances have an injurious effect; but, by using it only when the crops are young and luxuriant, they assimilate its gases, and a most marked effect is produced upon their growth and productiveness. This kind of liquid manure is generally applied to wheat, barley, and all the cabbage tribe, and other garden vegetables; but not to rice, which is always flooded during its growth.

This manure is sometimes used after putrefaction and fermentation have taken place ; and even in this state it is very efficient. In the gardens near Canton it is often dried and mixed with the soil taken from the bottom of the lotus ponds, and used for growing plants in pots, or for enriching any particular tree which may be a favourite in the garden.—*Fortune's Wanderings in China.*

EXCISE PROSECUTION.

The proceedings which have been for some time pending between the Board of Excise and Mr. Bailey have recently terminated in a verdict for the defendant, which circumstance has given rise to the following curious circular from a London manufacturer to his customers. We cannot applaud the *animus* which dictated such a document ; at the same time it affords evidence of the unsatisfactory state of the Excise laws.

We think a reduction in the duty, and a repeal of the regulation prohibiting manufacturers and large consumers from purchasing spirit directly from the original distillers, would have a salutary effect. An oppressive law, which cripples trade and places our manufacturers at a disadvantage, in comparison with their foreign rivals, furnishes what some persons consider a pretext for evasion, and those whose consciences do not possess this kind of "elasticity" are the sufferers. The difficulty of obtaining a conviction increases with the severity of the law, and is at the maximum when the sympathies of the public are on the side of the defendant, which is too often the case in Excise prosecutions. Although we have no sympathy with those who violate the law, we should be glad to see the repeal or amendment of any Act which in its operation is oppressive and injurious to the commerce of the country.

CIRCULAR.

LONDON, * * * * * * * * * *.

I beg to hand a List of Chemicals, and in soliciting your patronage, respectfully observe the quality of each article is of undoubted purity, in confirmation of which I draw your attention to the undermentioned Advertisement :

Copy of Advertisement in the *Times* of November 3d, 1847 :

"TO WHOLESALE DRUGGISTS, &c.
"ÆTHER SULPH. RECT. 740 Degrees.
"SPT. AMMON. AROMAT.
"— ÆTHER NIT. OPT. 850 Degrees.

"The above are drawn from duty-paid Spirit; for purity of Aroma cannot be excelled, or in price equalled in the Trade.

"For Price, Terms, and Contracts, apply to S***** W******* G***, ****** ****, City."

I also subjoin a copy of the important decision given at the Court of Exchequer, on November 18th, 1847.

"COURT OF EXCHEQUER, THURSDAY, NOV. 18.
(*Sitting in Banco*).

THE ATTORNEY-GENERAL *v.* BAILEY.

"The Chief Baron also delivered judgment in this case, which was in the nature of an information for penalties against a wholesale Chemist for selling sweet spirits of nitre without payment of duty, or taking out any licence for the sale of spirits. There was a verdict for the Crown at the trial, subject to the opinion of the Court, whether sweet spirits of nitre came within the meaning of the statute under which the information was filed. Now, sweet spirits of nitre was an article well known and easily distinguishable from what was ordinarily called "spirits." The Act on which the information was founded gave no precise definition of the word "spirits;" and, therefore, it was to be assumed that by "spirits" was meant what was ordinarily known as spirits, and not sweet spirits of nitre. No doubt spirits entered into the composition of sweet spirits of nitre as they did into other articles; still in common parlance no one confounded the two articles. There had been a case in this Court (reported in 4 *Price's Reports*), where a blacking dealer was sought to be charged with penalties as a dealer in vinegar, because vinegar was used largely in the manufacture of blacking; but the Court held that this did not make the blacking manufacturer liable. So in this case, the Court refused to put a strained construction on the Act of Parliament, and to say that regulations relating to the sale of "spirits" comprehended the sale of an article well known and readily distinguishable from spirits, like sweet spirits of nitre. The Court, under all the circumstances, directed the verdict to be entered for the defendant.

"Judgment accordingly."

Soliciting your commands, which will have prompt attention from
Your obedient servant,

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NOTICES OF BOOKS.

AN ESSAY ON THE DISEASES OF THE JAWS AND THEIR TREATMENT. By LEONARD KOECKER, Surgeon-Dentist, &c. New Edition, with Copious Notes and Appendix, containing Tables of upwards of Three Hundred Cases. By J. B. MITCHELL, M.D., Surgeon-Dentist. 8vo, pp. 95. John Churchill.

MEMOIRE SUR LES SUCS ASTRINGENTS CONNUS SOUS LES NOMS DE CACHOU, GAMBIR, ET KINO. Par M. GUIBOURT, Professeur à l'école de Pharmacie, Member de l'Academie Royale de Medicine, &c. Paris.

WE have much pleasure in announcing on authority as a general answer to numerous Correspondents, that DR. URE's long-promised and expected NEW DICTIONARY OF CHEMISTRY AND CHEMICAL ANALYSIS, is in a forward state, and will shortly be published. The article on "Acetic Acid," in another part of this number, is a fair specimen of the style of the author, and contains some new and interesting matter. Want of space obliges us to defer the remaining portion of it until next month.

TO CORRESPONDENTS.

We have received from a Correspondent some strictures on our Article of last month, on the Apprenticeship System, and hope the concluding portion of the Article, which is in this Number, will explain those points on which we appear to have been misunderstood. We have not published the letter of our Correspondent because he omitted to sign his name.

E. A. G.—Chloride of Zinc or Nitrate of Silver are sometimes used for such purposes, but should only be employed under proper advice.

Z. X. Y. Should read *Dr. Pereira's Lectures on the Polarization of Light*, in the Second Volume of this Journal.

A. Z.—(1.) Four ounces of Ginger to sixteen ounces of Spirit will make a strong Essence. This is twice the strength of the Tincture of Ginger. P.L. —(2.) Yes.—(3.) Use twice the quantity of the active ingredient.—(4.) Yes.

"*Inquirer.*"—Extractum aloes aquosum.

S.—(1.) It is illegal to make soap without a licence.—(2.) See vol. ii., p. 469. (Liquor Hydriodatis Arsenici et Hydrargyri.)

I. F. M.—(1.) There is no "Royal road" to a knowledge of Chemistry and Pharmacy; the best plan is to attend lectures, and read such works as *Pereira's Materia Medica, Fownes's Manual of Chemistry*, and the Pharmacopœia.—(2.) In this country any persons may sell poisons.

"*A Constant Reader.*"—(1.) *Fownes's Manual of Chemistry.*—(2.) The Professors in each School direct the Students in the choice of books.

R. S. J.—We have repeatedly explained the provisions of the Medicine Stamp Act. See vol. vi., p. 456. Those who dress up the preparations of the Pharmacopœia in the disguise of quack medicines must affix the stamp.

"*Phœnix, D.*"—A Chemist does not become liable to the tax for armorial bearings by using a Phœnix as an emblem of his business.

E. H. L.—We are not in the habit of performing analyses for anonymous correspondents, which would occupy more time than we have to spare.

M. R. J.—Various disputes have arisen respecting the definition of the term "Practising as an Apothecary." We have several times given our ideas in detail on the subject. See vol. iv., p. 245.

J. J. W. cannot be admitted into the Pharmaceutical Society without passing an examination.

G. Burnley.—(1.) No.—(2.) It is uncertain.

Dr. Wansbrough requests the insertion of a formula for a powder which he calls Pulvis Basilicus. This we have much pleasure in doing. As there is already a recognised powder, formerly a Pharmacopœia preparation, and extensively used, under the name of Pulvis Basilicus, the application of the same name to a different powder would lead to confusion, and, on principle, this should always be avoided. The following is the formula for Dr. Wansbrough's powder :—

℞ Pulv. Jalapæ. Pulv. Antimonii Comp.
—— Scammonii. —— Potassæ Supertart.
Hydrarg. Chloridi ana partes equales.

A.G.L.—(1.) The Prussian blue described at page 182, No. iv. of this Journal, may be washed on a filter by percolation. It is insoluble while the saline matter is present.—(2.) We do not know.

J.H. (1). Candidates at the examination for admission into the Pharmaceutical Society, ought to be acquainted with the Edinburgh and Dublin, as well as the London, Pharmacopœia.—(2.) Syrup, if properly prepared, ought not to deposit crystals of sugar.—(3.) The method of making a show colour from oxide of cobalt, is described in an early number of this Journal.

G.S. wishes for a formula for making India-rubber varnish for boots.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. VII.—JANUARY 1st, 1848.

THE EXAMINATIONS OF THE PHARMACEUTICAL SOCIETY.

(The Board of Examiners consists of eight members of the Society, four of whom at least, must, according to the bye-laws, be members of the Council. The regular day of meeting is the third Tuesday in each month—special meetings being appointed when occasion requires.)

In consequence of numerous inquiries from correspondents respecting the nature of the examinations, we think it advisable to publish, in a more detailed form, the instructions contained in Vol. ii., No. 8.

THE CLASSICAL EXAMINATION.

The object of this examination is to ascertain whether the candidate has acquired that elementary knowledge which is essential as the groundwork of the education of the Pharmaceutical Chemist. Those who reside within ten miles of London are required to attend at 17, Bloomsbury Square: in other cases the examination may be conducted by any qualified person or persons in the country, whose certificates, if satisfactory, are received by the Board of Examiners. In order to afford every encouragement to apprentices to submit to the examination, the Council have considered it expedient not to raise the standard of proficiency too high in the first instance; the candidate is, therefore, merely required to show that he possesses a sufficient acquaintance with the Latin language to enable him to translate the Pharmacopœia and physicians' prescriptions, and that he is conversant with the simple rules of arithmetic. The policy of not expecting too much from candidates at present, has been proved by the result, 400 students having voluntarily passed the examination, many of whom would have resisted it altogether if the ordeal had been too stringent. Cases have come to our knowledge, in which this test of proficiency has deterred some from entering the business, who did not possess even the moderate attainments required, and who, sensible of their deficiency, wisely directed their attention to some other vocation.

We hope that it will, in process of time, be found practicable and expedient to extend the course of study required for this examination, feeling persuaded that an elementary acquaintance with physics and mathematics is of great importance, and that some knowledge of the modern languages might be added with advan-

tage. This, however, will be a subject for consideration when the examination is enforced by Act of Parliament.

THE MINOR EXAMINATION.

This examination comprises, besides the Latin language, Chemistry, Pharmacy, Materia Medica, and Botany, and it must be passed by all candidates for admission as ASSOCIATES of the PHARMACEUTICAL SOCIETY.

In the first place, the candidate is required to read and translate several Latin prescriptions, giving the terminations of the words, with a literal and explicit interpretation of the directions. He must prove, by the facility with which he performs this elementary exercise, that he is familiar with the technical terms, and the vocabulary of the Latin language, and, consequently, competent to take the first step in preparing prescriptions—namely, to read the instructions of the Physician.

The next subject of examination is the Materia Medica. A variety of articles are on the table—barks, roots, gums, fruits, seeds, leaves, resins, &c. &c. none of which are labelled; and the candidate is expected to select from among the number, any specimen which may be called for, or to mention the name of any which may be pointed out. He is questioned as to its nature and properties; the part of the world whence it is procured; the animal or plant, as the case may be, from which it is derived; and any other particulars which are important in its natural history and application to Pharmacy. The metals, earths, alkalies, acids, salts, and other substances used in medicine, are included in this part of the examination.

The distinguishing characteristics of plants, as exemplified by plates or specimens, are to be described; and although Botany does not at present take a prominent place in the examination of Associates, a candidate is expected to be able to recognise the medicinal plants in daily use, and to describe their leading characters, and the parts of each plant which are used in medicine.

The questions in Chemistry relate to the composition of the various substances enumerated in the Pharmacopœia; the decompositions which occur in the manufacture of chemical compounds, and also in the routine of dispensing business; the leading tests for some of the most powerful poisons, and the modes of detecting impurities in ordinary cases. An acquaintance with the weights and measures is also essential.

THE MAJOR EXAMINATION

is passed by candidates for admission as MEMBERS of the Society, and it comprises all the above subjects, as well as a more minute acquaintance with the tests and antidotes for ordinary poisons.

Besides the *viva voce* examination, answers to written questions are required, and the examination is in every respect more stringent than that of Associates.

The object in establishing the two examinations, namely, the Minor and Major, is, that it is desirable for young men, at as early a period as possible, to have their qualifications tested in those branches of information especially called into requisition in the daily routine of their business. If there had been only one examination for Members and Associates, either it would have been so stringent that young men would not be likely to come forward so early as might be desirable, or if the severity of the test had been reduced to suit the capacity and circumstances of the majority at this period, the ordeal would not be sufficiently complete to sustain the character of the Society.

By the plan adopted, and which is found to work well, the Minor Examination is brought within the reach of all young men of average abilities and application; and those who have passed it, may be safely recommended as dispensers of medicine, although they might not possess that amount of scientific knowledge and experience which would be desirable in those who have the responsibility of managing a business.

We may also observe, that some of the students who come up for the Minor Examination, having had great facilities for improvement, especially those who have been practical pupils in the Laboratory, are found to be so well qualified, that they pass the Major Examination almost immediately afterwards. In some cases, this plan is convenient, for while the course of instruction is fresh in the mind, it is more easy to pass than at a subsequent period, after the chain of study has been interrupted by the ordinary avocations of business.

Notwithstanding this apparent advantage, we should recommend an interval of not less than three or four months between the Minor and Major Examinations, when this can be arranged without inconvenience, because the exertion of preparing a second time for examination, is likely to impress the knowledge more indelibly on the memory, than the single effort followed by a cessation of that kind of study which an examination requires.

We may add a few suggestions respecting the most effectual method of preparing for the Examinations. In the case of the classical examination, this responsibility rests on the parents of the youth, and we particularly recommend those who desire their sons to distinguish themselves, not to be in haste in removing them from school. The practice of binding a youth as an apprentice to a Chemist, at the age of fourteen or fifteen, cannot be too severely deprecated.* It is an indisputable fact, that one

* Those whose means will not admit of their giving their sons the requisite liberal education, should bring them up to some other business.

year at school after fifteen, is worth more than any two previous years, and those who neglect this axiom, deprive their sons of the benefit of education exactly at the time at which they are beginning to appreciate it, and when they may be expected to make the most rapid progress. This sacrifice at the most important period of life, admits of no remedy afterwards, for, in the words of Solomon, "there is a time for all things;" and if a liberal education be not obtained in the time of youth, the deficiency will be a source of regret throughout life.

We consider the age of sixteen to be quite early enough for the apprentice or pupil to begin his Pharmaceutical studies; and if he has been at a moderately good school, he will with great ease pass the Classical Examination. In four years he ought to be able to pass the Minor Examination with credit; and for this purpose he should employ his leisure hours, early in the morning or in the evening, in study, reading elementary works on Chemistry, Materia Medica, and Botany,* and taking every opportunity which may occur of making the preparations of the Pharmacopœia. If he can attend lectures this will be found of great service. Much industry and application will enable the student to acquire a very fair knowledge of his business merely from his own resources; but we recommend lectures whenever they are within reach.

In order to obtain the most complete knowledge of the theory and practice of Pharmacy, the practical course of instruction in the Laboratory at Bloomsbury Square, will be found of the greatest service, and the proficiency generally displayed by the laboratory pupils, at the Examination, places them quite beyond the average of Pharmaceutical students.

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* As we receive every month many letters from Correspondents, inquiring what books we recommend for those who are preparing for the examination, we give the following as a general answer:—

Materia Medica and Pharmacy.—*Pereira's Elements of Materia Medica*, £2 10*s.*; *Royle's Elements of Materia Medica.* 12*s.*; *Thomson's London Dispensatory*, £1 1*s.*; *Christison's Dispensatory*, 18*s.*; *Phillips's Translation of the Pharmacopœia*, 12*s.*; *Selecta è Prescriptis*, 5*s.*

Chemistry.—*Fownes's Manual of Chemistry*, 12*s.*; *Gregory's Outlines of Chemistry*, 12*s.*; *Graham's Elements of Chemistry*, £1 6*s.*; *Turner's Elements of Chemistry*, £1 10*s.*

Botany.—*Lindley's School Botany*, 5*s.* 6*d*; *Lindley's Elements of Botany*, 12*s.*; *Lindley's Introduction to Botany*, 18*s.*; *Lindley's Natural System*, 18*s.*; *Lindley's Synopsis of the British Flora*, 10*s.* 6*d.*

Toxicology.—*Christison's Treatise on Poisons*, 18*s.*; *Taylor on Poisons*, 12*s.* *Guy's Principles of Forensic Medicine*, 10*s.* 6*d.*

We have named several works of each class, with the prices, in order that our readers may make a selection, according to their circumstances.

THE VIGILANCE OF THE GOVERNMENT IN REFERENCE TO SANITARY REGULATIONS.

It is the province of a good Government to exercise a watchful jurisdiction over all matters relating to the public health, and it is satisfactory to observe the attention which the members of our present Government are devoting to this important subject. The late Health of Towns' Bill had for its object the introduction of an improved system of ventilation, cleansing, and drainage, the removal of nuisances, and the general supervision of all casualties affecting the sanitary condition of the public.

The opposition raised against this Bill by some of the corporations, had reference, not to its general principles, but to the machinery by which it was proposed to carry out the details, and these objections being merely of a technical nature, may be overcome without difficulty by the introduction of certain modifications in the Bill. We have, therefore, every reason to anticipate that, during the present session of Parliament, an efficient Sanitary Bill will be passed, and we have been informed that considerable progress has been made in the undertaking.

The old Commission of Sewers has already been terminated by an exercise of the Royal prerogative, and this department has been reorganized and placed under a new system of management. Notice has been given of a Bill to effect a complete survey of the sewers of London, with the view of rectifying the defects now existing in their construction and arrangement, and these proceedings, will, in all probability, extend to the sewers of other localities throughout the kingdom.

The energy of the Government in carrying out sanitary improvements, has been displayed in the re-modelling of streets and widening of thoroughfares—the demolition of unwholesome and badly-constructed tenements—and the erection of dwellings of a superior character in their stead. The establishment of public parks, and the encouragement given to the erection of baths and wash-houses, may be mentioned among the praiseworthy efforts of a liberal government to promote the public health.

The appointment of a Sanitary Commission, and the parliamentary investigations that have recently taken place respecting the supply of water and the ventilation of public buildings, as well as other edifices, especially the dwellings of the poorer classes, the inquiries into the progress of fever and other epidemics, and the precautions emanating from head quarters, in reference to the probable approach of the cholera, may also be enumerated among the sanitary reforms of the age. We have already had occasion to advert to the official investigation of the properties of disinfecting agents, and even secret remedies for fever and other disorders have

not been disregarded. Although we cannot applaud the patronage of quackery involved in the latter description of inquiry, we mention the fact as an indication of the desire evinced by the members of the Government to perform efficiently their responsible duty as guardians of the public health, and rather to carry this course to the verge of over credulity, than to incur the risk of losing any possible advantage from an alleged discovery for want of full investigation.

Such is the zeal and such the activity of the Government in matters relating to the public health. It remains for us to describe the manner in which this principle is carried out in reference to the protection of those who are suffering from disease.

The remedies in common use for the relief of disease are various in their nature and properties, and they are prescribed by medical practitioners, whose qualification is regulated and enforced by act of Parliament. A majority of these remedies are powerful in their action, and their efficacy in all cases depends upon the skill and judgment with which they are prescribed, and the accuracy with which they are prepared and dispensed. The preparation and dispensing of these remedies is a very responsible duty, demanding a particular course of education to ensure the requisite knowledge and experience in the dispenser. The performance of this duty by persons not possessing this knowledge and experience is an unjustifiable trifling with life and death—an abuse more dangerous to the public than the emanations of sewers or a scanty supply of water. In almost every civilized nation, except Great Britain, this danger is guarded against by strict laws, prohibiting the practice of Pharmacy, as well as that of Medicine, by unqualified persons, and inflicting heavy penalties on those who infringe this regulation.

In Great Britain—a nation which boasts of setting an example to its neighbours in all matters relating to the public health and comfort—at a time when the words sanitary reform are ringing in our ears from one end of the kingdom to the other—the claims of the sick to the protection of the legislature are disregarded; poisons are retailed by grocers and hucksters in the same scales which are used for weighing tea and sugar; prescriptions are dispensed by persons whose only qualification is a coloured show-bottle, by which means the lives of the sick are daily endangered, and the intentions of medical practitioners frustrated. The adulteration of drugs is carried on to a fearful extent; and drugs which are so much damaged as to be rejected by the regular chemist, are extensively bought by those who, not knowing the difference between good and bad, buy the cheapest articles they can obtain. This is the inevitable result of the practice of Pharmacy by uneducated persons.

Numerous memorials have been presented at the Home Office by the Pharmaceutical body during the last seven years, praying for the introduction of a law to remedy this evil. Replies have been received from Sir James Graham, and more recently from Sir George Grey, admitting to the full extent the importance of the subject. Yet no Bill is brought in, and the question is deferred from one session to another without any active steps being taken by those from whom such assistance might have been anticipated.

Such apathy on the part of a sanitary Government, in what is obviously a branch of sanitary reform, is unaccountable, except on the assumption that medicines are considered altogether superfluous. We cannot even admit this as an extenuation: for agents so potent as are the preparations in daily use, must either be weapons of good or evil: if of evil, they should be prohibited by Act of Parliament, if otherwise, their administration should be regulated by safe and efficient laws. This plea, however, has never been advanced, and the necessity for education in those who *prescribe* medicines is fully recognised, while (as we have frequently had occasion to remark) the legislature appear to consider it a matter of no consequence whether or not the patient obtains what is prescribed.

It would appear that it is within the province of the Government to investigate medicinal agents; for, when Ledoyen's fluid was introduced to the House of Commons as a remedy against contagion, a committee of inquiry was appointed, and the "discoverer" was dispatched to Canada, at the public expense, to wave a flag, moistened with the magic fluid, in some of Her Majesty's vessels.* This zealous endeavour to add a new remedy to the list of the Materia Medica, appears remarkable, when we remember that the articles already on the list are allowed by law to be sold to the public, who are incompetent to test their quality, by persons who are equally incompetent. It may appear superfluous to repeat what has been stated a hundred times, but we shall continue to reiterate the glaring facts of the case, and to represent them in every possible aspect, so long as the source of complaint continues to exist.

The House has adjourned until the beginning of February. In the meantime we suggest to our brethren throughout the country the propriety of requesting their representatives in Parliament to use their influence with the Secretary of State, whose hesitation in embarking in the undertaking, would, in all probability be removed, if stimulated by the "pressure from without," and fortified by assurances of support within the House.

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* We regret to learn that Col. Calvert, who accompanied M. Ledoyen in this mission, has fallen a sacrifice to the fever.

SANITARY REGULATIONS.

Penalties for selling bad Food.

According to the law which makes provision for the abatement of nuisances, it is a nuisance for a common dealer in provisions to sell unwholesome food, or to mix noxious ingredients in the provisions which he sells. The offence being proved before a magistrate, summary conviction is obtained, the articles being seized, and a penalty inflicted. Informations in such cases may be laid by any person: but in some of the markets inspectors are appointed to protect the public against these frauds, by taking proceedings against the offenders.

Damaged provisions having been seized in this way, are destroyed to prevent the possibility of their finding their way again into the market.

The public are generally capable of judging of the quality of meat, fish, and other ordinary provisions, especially in the city, where the greatest precautions are taken.

Nevertheless, it is considered necessary, as a sanitary measure, to enforce the prohibition against nuisances in the case of food, to prevent the public from being cheated with their eyes open.

When fish is tainted there can be no mistake in the matter, and no one is obliged to eat it; but the law has a watchful eye over the sanitary welfare of the public.

Free Trade in bad Drugs.

The law makes no provision for the suppression of the sale of bad drugs. These are constantly sold by public auction, sometimes damaged so as to be unfit for use, or adulterated to the extent of 80 per cent. The fact is notorious. We are informed, on good authority, that many cwts. of scammony have recently been imported which may be had at about 4*s.* a pound.—Scammony may be had at any price between 4*s.* and 36*s.*, according to the quality.

Numerous other instances might be mentioned, but no system of inspection exists, and a conviction would be extremely difficult, if not impossible, as the law does not recognise this traffic as a nuisance, and it cannot be dealt with as a fraud, unless deception could be proved.

The hucksters and grocers, who also carry on business as Chemists, are, as well as the public, incompetent to judge of the quality of drugs, and generally buy the cheapest.

Nevertheless, no provision is made for checking this evil at its source, and the public, having no means of detecting the fraud, make no complaint.

When medicine fails to produce the desired effect, lingering illness or loss of life may be the result, but it remains an open question whether the *onus* rests with the doctor, the disease, or the drugs.

THE TAX ON LIGHT AND AIR.

The light of Heaven is the birthright of every human being, and the air that we breathe is one of the most important necessaries of life. Any deficiency in the supply of either of these blessings has a direct tendency to impair the health. On this circumstance, chiefly, depends the difference in the salubrity of crowded cities and rural districts, and it should be the aim of the political economist, to use the appliances which science and experience place within his reach, in such a manner as to diminish the natural evils of populous districts, and thus to approximate their atmospheric condition as nearly as possible to that of the country. This is the rule which common sense dictates, and which chemistry and medical experience confirm ; and it is universally admitted that a neglect of the principles of ventilation is one of the most fertile sources of fever and other epidemics.

We are not aware to whom belongs the credit (?) of conceiving the extraordinary idea of placing a tax on these elements of health, and thus undermining the constitutions of those who, from poverty or parsimony, shrink from the payment of money for what they justly consider to be the free gifts of Providence. It is sufficient to know that this monstrous proposition has not only been entertained, but enacted into a law ; and that by this baneful measure thousands of our countrymen are doomed to live in a tainted atmosphere, and deprived of the cheering influence of light. Those who suffer most severely from this evil are not free agents, as it is the province of the landlord to protect his interest by reducing his window tax to the minimum, and his poor tenants are obliged to take such accommodation as they can get. In a recent inquiry of a committee, in the parish of Marylebone, into the sanitary condition of the poor, it was found that in many courts and alleys there were no openings over the area doors, the passages were absolutely dark, and the windows of some inhabited rooms were blocked up—these extreme expedients having been resorted to for the purpose of avoiding the tax. In some cases houses had been placed in the hands of the surveyor, with instructions to block up as many windows as possible ; and by this means many healthy and comfortable dwellings had been converted into gloomy unwholesome dens. These hardships fall chiefly on the poorer classes, who have no remedy within their reach. The responsibility rests with the legislature, who ought to be aware that a tax upon health is not all profit, since the spread of disease is calculated rather to create a demand upon the poor-rates than to facilitate the payment of taxes. During the recent prevalence of fever in the metropolis, the virulence and fatality of the epidemic

have, in numerous cases, been traced to the want of ventilation in the dwellings of the poor.

We have much satisfaction in stating, that delegates are appointed by the metropolitan parishes to confer on the subject, and to adopt such measures as may be most likely to effect the repeal of this obnoxious tax. During the late election, one of the most common pledges required of candidates, was a promise to support this repeal, and the Sanitary Commissioners appointed by the Government, have admitted that "without the immediate repeal of the window tax, any measure of sanitary reform would be abortive."

Some zealous advocates of the cause have advanced the argument that the window tax occasions the disfranchisement of many electors who are defaulters. We think this argument is not only unnecessary, but prejudicial, since the same objection would apply to any other tax, so long as defaulters are prohibited from voting. One convincing argument is better than a dozen which admit of a cavil, and thus injure the cause. No argument is required but the one with which we set out, and by adhering to this as a sheet-anchor, we have no doubt that the combined efforts of the rational portion of the public, will be attended with success.

FRAUDS AGAINST THE EXCISE.

We have ascertained that the report of the trial, Regina *v.* Bailey, quoted in the remarkable circular which we published last month, was an imperfect statement, and calculated to give an erroneous idea of the case. Endeavours have been made to pervert the apparent triumph of the defendant to dishonest purposes, by giving currency to the impression, that sweet spirit of nitre, not being considered spirit in the legal acceptation of the term, might, therefore, be safely bought and sold under any circumstances, without liability to seizure.

This notion is entirely erroneous, and those who act upon it must do so at their own peril. Any person purchasing sweet spirit of nitre, at a price below that at which it can be made with duty-paid spirit, is liable to an Excise prosecution, on the presumption that he buys it knowing it to have been illegally prepared.

The case of Mr. Bailey is not settled. The flaw in the indictment was merely a legal technicality, depending on the definition of the word *spirit*. The matter is now before the Attorney and Solicitor-General, who will proceed with it at the opening of the ensuing term. The Board of Excise are adopting measures for the protection of the honest manufacturer, whose interest is seriously injured by competition with smugglers. We

expect to have further information to communicate next month, and in the meantime give the following, which is an authentic version of the case above-mentioned.

Westminster Hall, November 18*th*, 1847.

In the Exchequer.]

THE ATTORNEY-GENERAL *v.* BAILEY.

JUDGMENT.

Lord Chief Baron Pollock.—This was an information against the Defendant for an infringement of the Excise Laws, in having purchased and received from a man named Faulconbridge, who was not a licensed distiller or rectifier, a large quantity of spirits without a permit, and the duty on which had not been paid. There were several counts in the information, the subject matter of the illicit dealing being in all of them described as "a large quantity, to wit, twenty gallons of spirits."

It was proved at the trial, that the Defendant, who is a wholesale Druggist and manufacturing Chemist, had for some time been in the habit of purchasing from Faulconbridge large quantities of sweet spirits of nitre: it was also proved that the sweet spirits of nitre so sold were made by mixing nitric acid with spirits of wine, except on the first occasion, when oil of vitriol and saltpetre were used instead of nitric acid. The spirits used by Faulconbridge, in making the sweet spirits of nitre, had all been illegally distilled by him, and no duty had been paid; all which was known to the Defendant, who supplied Faulconbridge gratuitously with the nitric acid which he mixed with the spirits of wine. The sweet spirits of nitre so supplied by the Defendant, were ordinary merchantable sweet spirits of nitre, such as were usually sold by Chemists and Druggists. The Defendant was convicted on all the counts of the information, and there is no doubt but that the conviction is perfectly good, if the sweet spirits of nitre supplied by Faulconbridge were spirits within the true intent and meaning of the 6th of George IV., chapter 80, and two subsequent Acts on which the information was founded. The Attorney-General, in support of the conviction, argued that the liquid seized was clearly spirits within the statutes, it having been proved at the trial, that every four and a half gallons of the sweet spirits of nitre in question contained six gallons of spirits at fifty-six over proof; and further, that the chemical analysis of the compound gives eighty parts of uncombined spirits to twenty of hyponitrous ether; and he further argued, that by the very terms of the statute 6th George IV., cap. 80, sec. 101, such a mixture is defined to be spirits within the Act. The language of the clause referred to is as follows. After previous enactments, as to what shall be deemed to be low wines and what feints, it goes on to enact

"That all other spirits produced by re-distillation, and which shall not have had any flavour communicated thereto, and all liquors whatever which shall be mixed or mingled with any such spirits, shall be deemed and called Plain British Spirits, and that all other spirits produced by re-distillation, and which shall have had any flavour communicated thereto, and all liquors whatever which shall be mixed or mingled with any such spirits, shall be deemed a British compound called British Brandy.

With respect to any argument to be deduced from this last-mentioned section, it must be observed that there is not in truth any definition as to what is meant by the word *spirits*.

The section is not an interpretation-clause explaining the meaning of the word *spirits*, but an enactment as to what are to be deemed to constitute the different classes or denominations of spirits. It assumes that *spirits* is a word of known import, and then proceeds to define the different classes of spirits, so that it does not enable us to determine the material point in this case, namely, what is the meaning of the word *spirits?*

In the absence, therefore, of any statutable definition, we must assume that the word is used in the Excise Acts in the sense in which it is ordinarily understood, and we do not think that, in common parlance, the word *spirits* would be considered as comprehending a liquid like sweet spirits of nitre. which is itself a known article of commerce, not ordinarily passing under the name of *spirits*.

It is very true, the case finds, that spirits enter very largely into the composition of sweet spirits of nitre, but so they do into the article called *sal volatile*, and into most, if not into all kinds of varnish, and so as to other fluids, which certainly no one in common parlance would speak of as *spirits*. And we think that nothing can be taken to be *spirits*, within the meaning of the 6th George IV., cap. 80, which does not come under the definition of an inflammable liquid produced by distillation, either pure, or mixed only with ingredients, which do not convert it into some article of commerce, not known in common parlance under the generic appellation of spirits.

It will be observed that in the 101st section, referred to by the Attorney-General, all the liquids there enumerated come within the description of liquids in different stages of progress towards *alcohol*, either pure or mixed with some other fluid or matter supposed to render it more agreeable as a beverage. The argument derived from the 6th and 7th William IV., cap. 72, also 6th and 7th Victoria, cap. 49, and the 5th Victoria, cap. 25, is entitled to great weight, and is strongly confirmatory of our view of this case. The object of those statutes was to put England, Scotland, and Ireland on an equal footing, in the exportation from one country to the other of articles which have paid a duty of Excise, the amount of which varies in the different countries; for this purpose the statutes allow a drawback in the case of exportation from the country where the duty is high, and impose a corresponding export duty upon exportations from the country where the duty is low. These statutes are only material, in the present case, so far as they show that the legislature did not treat the subject matter of the enactment in those statutes (and which in terms comprise sweet spirits of nitre) as being spirits, but as being mixtures, compounds, or preparations, into the manufacture of which spirits enter as the basis or principal ingredient or material thereof. This certainly tends very forcibly to show that we are right in holding that sweet spirits of nitre are not, in the opinion of the legislature itself, to be considered as *spirits*.

Another strong argument in favour of our view of this case is derived from the Licensing Acts. The 6th George IV., cap. 81, compels every retailer of spirits to take out a licence, for which he is to pay a duty at certain specified rates, and he cannot get such a licence

without also taking out a licence to sell beer, which he can only do after obtaining a previous licence from a magistrate. If, therefore, sweet spirits of nitre be spirits within the true intent and meaning of the Excise Acts, it can only be sold by a licensed dealer in beer and spirits: and the same observations will apply to *sal volatile*, spirit varnish, and many other articles of commerce of which spirits are a principal component part. All these matters are notoriously sold, and, indeed, this case states that they are sold, not by licensed dealers in spirits, but by Chemists, Apothecaries, or others; and we consider this to be a strong confirmation of the view of the case which treats them as something distinct from spirits, however largely spirits may enter their composition.

The only reported case relied on by the Attorney-General, was, "The Attorney-General *against* Green," in Price iv., p. 225; but that case differs materially from the present. It was an information in *rem.* for the condemnation of a large quantity of liquor preparing for vinegar, fraudulently deposited in an unentered place. The information was framed on the 43d George III., cap. 69, which imposes a duty on every barrel of vinegar, or liquor preparing for vinegar, which shall be made for sale. The Defendant was a blacking manufacturer, and the liquor was clearly a preparation for vinegar mixed with lamp-black and other ingredients used in making blacking; and it was proved that the liquid they so used merely for the manufacture of blacking was good vinegar when it had been left to stand and deposit the lamp-black and other materials used with it. The real question in that case was, whether, in order bring the liquor in question within the provisions of the statute, was necessary to allege and prove that it was liquor preparing for vinegar, for sale as vinegar. The Court held that it was not, and that it was liable to seizure, if it was liquor preparing for vinegar for sale, whether it was to be sold as vinegar or otherwise. It is obvious that this is not at all the present case. The analogous case would have been if proceedings had been taken against the purchaser of the blacking thus made, alleging that he had unlawfully in his possession vinegar which had not paid duty. The case is certainly no authority for holding that such a proceeding could have been supported.

We may further observe, that the case now before us does not find that the hyponitrous ether can by any known process be separated from the sweet spirits of nitre, so as to leave the spirits capable of being used as before the admixture. We give no opinion as to how the decision might be if the fluid was capable of being so divided. Such is not found in fact: inasmuch therefore as sweet spirits of nitre in itself is a well known article of commerce, mentioned in the statute by itself as a distinct substantive article of commerce, and not commonly known under the name of *spirits*, and not adapted for ordinary use as an intoxicating beverage, we think it is not *spirits* within the meaning of that word as used in the information, and consequently there must be Judgment for the Defendant.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

WEDNESDAY, DECEMBER 8th, 1847.

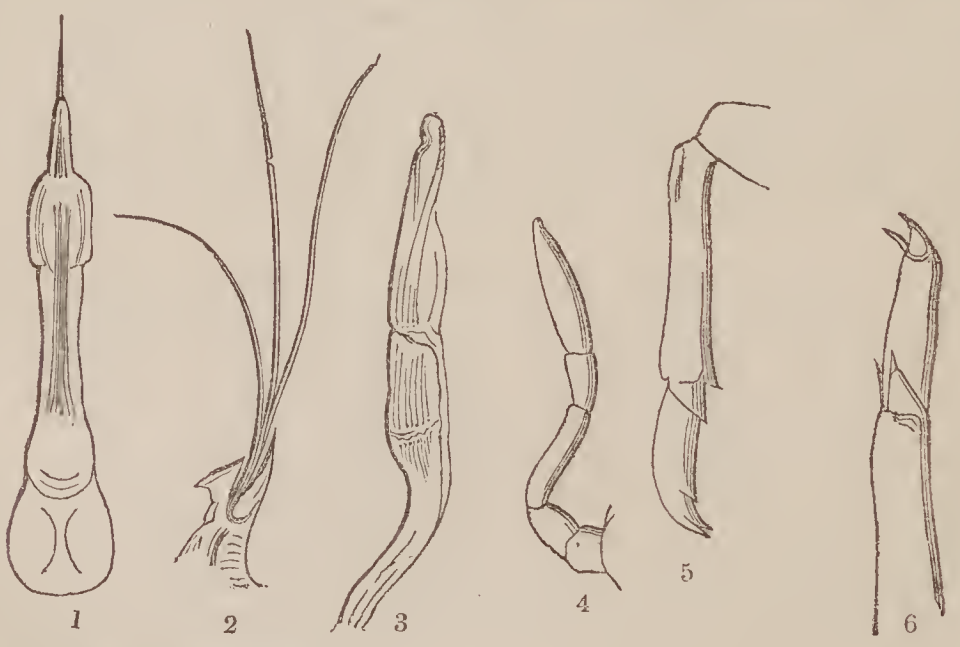
MR. SQUIRE IN THE CHAIR.

NOTE ON THE INSECT FORMING THE CHINESE GALLS.

BY EDWARD DOUBLEDAY, F.L.S., &c.

On submitting to a careful examination the minute insects contained in the galls given me by Mr. Morson, I at once saw that they belonged to the family of the Aphidians. Not having much studied this family of insects, I took into council with me, my friends Mr. Ingall and Mr. Walker, both of whom had paid much attention to them. To them and to Mr. Haliday, I am much indebted for information contained in this short notice.

The galls on being broken, are mostly found to contain a quantity of white downy-looking matter, and numerous little rounded, dark-brown substances, not bigger than grains of coarse sand. These black or brown atoms are the insects whose puncture of the leaf has produced the gall, and the downy substance is that peculiar white secretion with which most of the gall-making aphides, and numerous other species are covered.



1. Front view of the labium.
2. Labrum, maxillæ, and mandibles.
3. Side view of the labium.
4. Antenna.
5. Tibia and tarsus.
6. Tarsus and part of the tibia, showing the pointed triangular plates at the base of the tarsus.
7. Aphis found in the galls.

From the desiccated condition of the little animals, and their long-continued shaking about in the cavity of gall, this down has become detached, and the same causes have broken off the legs and *antennæ* of a large proportion of the specimens.

The insect itself is about one-thirtieth of an inch in length, and one-fortieth of an inch in breadth at its broadest part. The head is about one-hundredth of an inch in diameter; the thorax and abdomen become gradually wider to the termination of the abdomen, which is rounded at the outer angle, and emarginate in the middle of the posterior margin.

7

The *antennæ* are short, rather stout, about half as long as the body, and five jointed, the first and second joints short and stout, the second being the longer, third joint much longer, being more than equal to both second and third combined, fourth rather longer than the second, broadest at the apex, fifth about equal in length to the third and fourth combined, sub-fusiform, contracted a little before the apex, so as to appear at first sight to offer an articulation. The labrum is short pointed; the rostrum short, dilate before the apex. The legs are short, stout, the *tarsi* apparently two-jointed, furnished with two claws.

The structure of the foot is rather difficult to determine. I believe the tarsus to be two-jointed, the basal joint deeply notched below, for viewed in one direction there appears two pointed plates, one on each side the base of the tarsus, appearing like the spurs of the tibia, flattened, and much broader than usual. This appearance is probably owing, as Mr. Haliday has suggested, to the joint being deeply divided below, a structure which would allow a greater extent of vertical motion to the second joint. The insect will, perhaps, eventually be formed into a distinct genus in the family to which it belongs, but I leave the labour of characterising and naming it to some one who has better studied the family than I have.

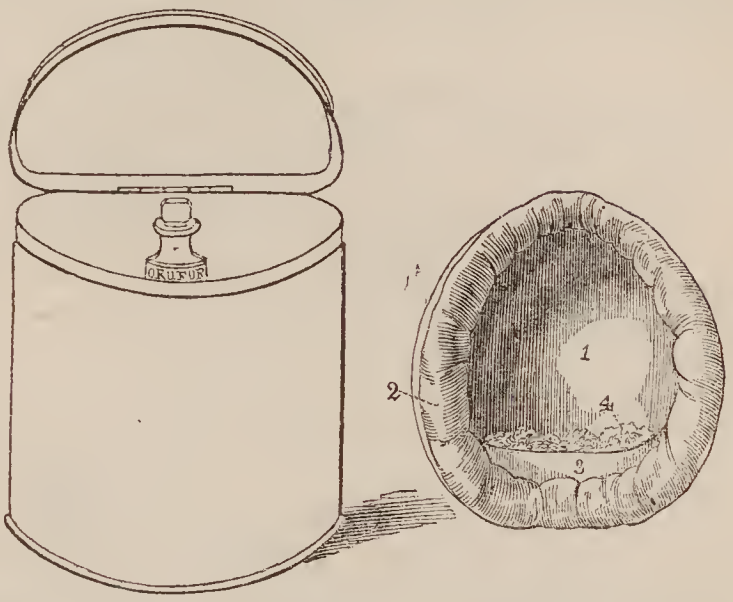
And now arises a question as to the mode of formation of the galls, and how the insects get into a hollow substance without the slightest opening, and how they live and breathe in a cavity which has no communication with the outer world, for the position of the little creatures is as puzzling, at first sight, as that of the apples recorded to have caused so much perplexity to a royal

head. Fortunately we have some clue to it. In all probability the gall is attached to the under side of a leaf. Its formation may be thus accounted for. The first puncture is inflicted upon the upper surface of the leaf by the female aphis, which is to be the parent of the colony. From the effect of this wound a cavity is formed, by the præternatural expansion of that part immediately around it, which of course, as the expansion is not shared by the whole leaf, assumes on one side the appearance of a small blister, but on the other has an opening of greater or less dimension. In this sac the insect is lodged, and here its progeny is brought forth. Their puncturing the inner surface of this cavity for the purpose of sucking the fluids which form their food, increases the disease of the leaf, and the swelling goes on increasing, but not at the basal part, and it thus becomes of a bladder-like form, connected to the leaf by a narrow neck. As the bladder extends and thickens, the neck also becomes thickened, but this thickening going on internally only, or at least chiefly, closes the aperture, and thus all hope of exit seems cut off from those who have entered. But here they probably live and increase and multiply for some time, in a little world of their own, shut out entirely from light, and only getting so much of the outward air as may pass through the compact substance of the gall. This imprisonment, if continued, would ultimately destroy the whole race, as in the event of the gall falling with the leaf, and thus becoming dried up, the whole must perish. But from what we see of somewhat similar galls in Europe, we must suppose that ultimately these galls burst, and thus allow the insects to escape. This probably takes place at the period when, after some generations, all wingless, and perhaps all females (for like other aphides, it is probable that the females produce several generations without impregnation) there is brought forth a winged generation of both sexes. These winged individuals can then fly to other spots and deposit their eggs, which in another year will give birth to a fresh race. This of course is only a supposition, but rests on the observed habits of other species.

It would be very interesting to ascertain the real nature of the shrub on which the galls are found, and the mode in which they are attached, whether it is to the upper or under surface of the leaf, what is their appearance when they have burst, and especially to discover the insect in its winged state. We may hope for this, perhaps, from some of our residents in China, and shall rejoice if this short paper brings any further details to confirm or to confute my views. Truth is all we have to desire in Natural History, as in all else.

CHLOROFORM INHALER.

BY MR. WILLIAM HOOPER, PALL MALL EAST.



This inhaler is constructed in the form of a large mouthpiece, enclosing a sponge (4) and having a pad (2) round the edge to ensure close contact. The cut represents the inner view (1) of the inhaler, with the case, which is provided with a bottle of chloroform, enclosing all that is required in a small compass. (3) is a ridge of metal to confine the sponge, and prevent the chloroform from running into the mouth.

CHLOROFORM INHALER.

BY MR. COXETER, OF 23, GRAFTON STREET, EAST.

This inhaler resembles the former, but is rather larger, and has a diaphragm of perforated metal between the sponge and the lips of the patient.

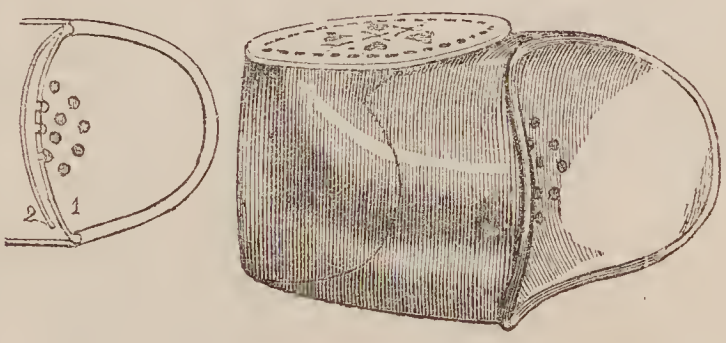


Fig. 1 represents the front plate with perforations—Fig. 2 the second plate to prevent the fluid being drawn into the mouth. It is left free at the bottom for the purpose of admitting air.

Several samples of chloroform were on the table, one of which, prepared by Messrs. Duncan and Flochart, of Edinburgh, had been forwarded by Dr. Simpson to Mr. Robinson.

Mr. Bell observed, that on the first introduction of chloroform, some confusion had arisen from the distinction between chloroform and chloric ether not being generally understood. The manufacturers having had more experience in the process, the chloroform now in the market was more uniform in quality. Mr. Bell had heard it stated by some operators, that chloroform

sometimes blistered the mouth when allowed to come in direct contact with it: on this account the interposition of a perforated plate, as in Mr. Coxeter's inhaler, was an advantage, as it kept the sponge at a suitable distance.

(The following have been received since the Meeting.)

CHLOROFORM INHALER.

BY C. STOKES, ESQ.,

Surgeon-Dentist, M.R.C S., No. 65, Lower Brook Street.

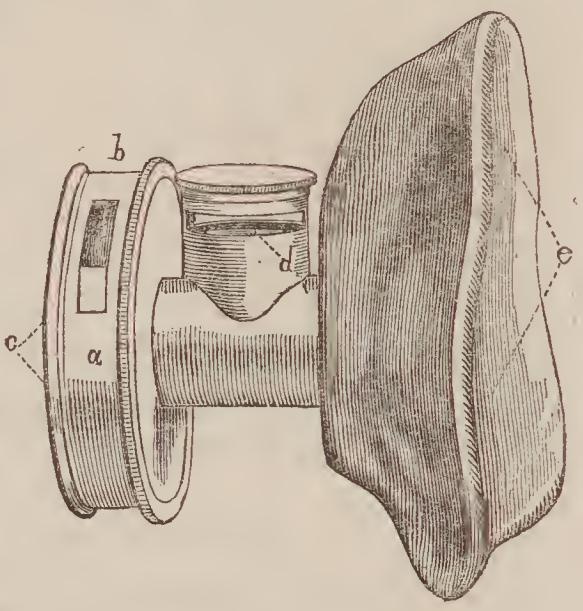
a. Box for the introduction of the sponge, which is placed between two perforated metal plates.

b. The opening through which the chloroform is poured: this is closed by a revolving slide.

c. The valve for admitting air, during the act of inspiration.

d. The valve for expiration.

e. Chamber for enclosing the mouth and nose.—This chamber may be detached for the convenience of travelling, an arrangement contrived by Mr. Hawskley.



The air being inhaled by the patient through the valve *c*, passes freely through the perforated plates, and the sponge containing the chloroform; consequently, respiration is performed with complete ease and without any sense of oppression. The vapour of chloroform is also received in its fullest intensity, and the vitiated air passes off through the valve *d*.

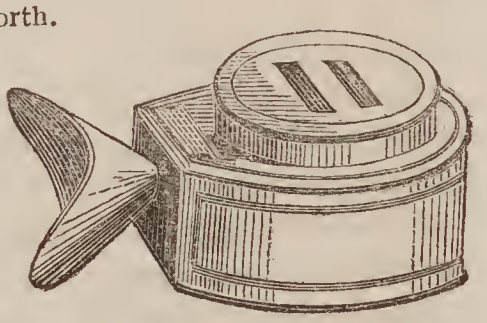
In cases where it becomes necessary to bring the patient under this influence with the least possible delay, it is advisable to place around the sponge-case pieces of lint or linen dipped in hot water.

By the arrangement of the circular box, a channel is always preserved for the reception of any quantity of chloroform which may drop from the sponge, thus preventing, during the act of inhalation, the possibility of any portion of this liquid coming in contact with the skin of the face. The valves are so constructed that their action continues effective and complete in any position of the instrument.

THE CHLOROFORM INHALER

OF MESSRS. STEVENS AND PRATT,

10, Gower Street North.



This instrument in principle resembles the above, and the cut sufficiently explains its construction without any further description.

Mr. Whitlock, of Salisbury, has contrived a very simple form of inhaler, which resembles a small mask, enclosing the mouth and nose. It is composed of porous cloth or silk lined with lint, and having a thin piece of sponge between the lining and outer covering.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected from September to December.

MEMBERS.

Birmingham . . .	Dowell, James, 25, Worcester Street
Guernsey	Naftel, Thomas P., St. Peter's Port
Hatherleigh . . .	Bolt, William Henry, Fore Street
Jersey	Ereaut, John, St. Helier
Kilmarnock . . .	Rankin, William, King Street
Leighton Buzzard .	Theobald, Peter Bassett, Corn Market
Liverpool	Fell, Thomas, 8, Bold Street
London	Gibbs, Nath. B., 81, Connaught Terrace
	*Greenish, Thomas, 20, New Street, Dorset Square
Plymouth	Smith, Samuel, East Street
West Indies . . .	Lediard, Charles, St. Vincent

MAJOR EXAMINATIONS.

Bowman, William	York
Gibbs, Nathaniel Birkett . . .	81, Connaught Terrace, Edgeware Road

MINOR EXAMINATIONS.

Banks, Alfred Joseph Humbley .	Bedford
Braithwaite, John Charles . .	Hereford
Harrison, Robert Hooper . . .	Southampton
Woodward, Charles . . .	Bicester

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Aspinall, W. Vint.	Mr. Race . .	Manchester
Capel, Alfred P. .	Mr. Prockter .	Cheltenham
Cheshire, Chas. H.	Mr. Gibson . .	Cheltenham
Compigne, Lloyd J.	Mr. Bolton . .	London
Corbould, Geo. G.	Ferris and Co. .	Bristol
Deacon, Frederick	Mr. Stannes . .	Tavistock
Downes, Robert .	Mr. Walker . .	Stockport
Evans, Henry S. .	Mr. Evans . .	60, Bartholomew Close
Forty, Thomas . .	Mr. Turner . .	164, Piccadilly
Gent, William T. .	Mr. Smallwood .	Macclesfield
Hankins, Thomas .	Mr. Sanders . .	Bristol
Hudson, Herbert .	Mr. Fox . . .	London
Jones, Thomas . .	Bowers and Co.	Chester
Orpe, Thomas M. .	Mr. Walton . .	Derby
Page, James . .	Fleeming & Co .	Wolverhampton
Peel, James . . .	Mr. Wilson . .	Canterbury

APPRENTICES.	RESIDING WITH.	TOWNS.
Priston, Geo. Wells	Mr. Hearder .	Torquay
Sewell, William .	Mr. Sewell . .	Sheffield
Stutely, Thomas .	Mr. Allen . .	Maidstone
Whiteway, William	Mr. Lodge . .	Torquay
Whitford, John L.	Mr. Jallands .	Kentish Town
Whyman, George .	Mr. T. Wylde .	Manchester

TRANSACTIONS OF THE BRISTOL CHEMISTS' ASSOCIATION.

On Tuesday, Nov. 2, a Lecture was delivered by Joseph Lancaster, Esq., on "A general View of the Structure of the Human Frame;" showing at a necessarily rapid glance the various materials of which it is built up, and the perfect adaptation of the parts to the whole.

At a late meeting of the Council it was resolved, that as so many gentlemen (and they were happy to find included some of their own body) had kindly volunteered to lecture on the occasions of their evening meetings—"That these meetings be doubled in frequency; that is, that they be continued for the future once in every fortnight."

LECTURE
ON THE ANATOMY AND PHYSIOLOGY OF THE HUMAN CIRCULATION,

WITH A PREFATORY SKETCH OF THE PRINCIPAL VARIETIES OF CIRCULATION IN THE LOWER ANIMALS.

Delivered before the Members of the Bristol Chemists' Association, December 7,

BY EDWARD MARTIN, M.R.C.S.

Mr. Chairman and Gentlemen,

When I was honoured a short time back by a request that I should deliver to the Members of your Society a lecture on some scientific point, I chose for my subject a portion of human anatomy and physiology, not only from a conviction of the interest and importance attached to these, but also from a knowledge of the difficulties which beset those who wish to obtain information respecting them, from the almost total absence in our language of works treating clearly of either, yet free from the obscurities of professional technicality.

I cannot help thinking that human anatomy has been viewed too much in the light of a mystery, pertaining only to the profession of medicine, and I feel certain that many and grave errors in the habits of life are daily committed by the great bulk of mankind, which might, and, doubtless, in a great measure would, be avoided, were there a more generally diffused intelligence of the structure and functions of the body; for how shall we recognise that which is likely to disarrange the action of the machine, if we know not the principle on which it works? and how shall we understand the principle, if we be doubtful concerning the construction? Therefore, do I claim for anatomical and physiological science, and as a part of them, for what I am about to speak of, not only the importance which attaches to any branch of knowledge for its own sake, but also that further interest which it obtains in being something personally relating to every individual.

Throughout the animal kingdom we find the structure of organs increase

in complexity in a beautifully adapted ratio to the requirement of the species. In the economy of creation, while nothing is wanting, it is equally true that nothing is superfluous. Nature nowhere wastes her admirable contrivances by giving an intricate arrangement where a simple one will effect the object.

Hence the examination of any important organ, or set of organs, throughout the different classes in which it exists, shows its development in an ascending scale, and so fully is this carried out, that in tracing it downwards, we do not generally find when we have arrived at the simplest form of the perfect structure, that at the next step below it is entirely absent, but that it still exists in an imperfect, and (if I may use the expression) "half-made" state, not perhaps wholly disappearing for some grades urther. Organs in this condition are styled "Rudimentary."

Such being the case, it is evident that the understanding of the more compound structures will be much facilitated by reviewing the simpler forms which precede them in the list, and which we may regard as their primary types, and we will therefore, previous to entering on the more immediate subject of consideration, take a slight and rapid survey of the different forms of the circulating system possessed by the lower animals.

In Cold-blooded Animals, which form by far the majority, the objects of a circulating fluid are two-fold:

1st. To carry *to* all parts of the body, for the nutrition of each, and for the proper performance of its function, the materials furnished by the air and by the food of the animal.

2d. To convey *from* every part the refuse set free by its disintegration or waste, and to transport it to those excretory organs given for the purpose of getting rid of it by their several channels.

In Warm-blooded Animals (which, strictly speaking, include only the two highest orders of creation: birds, and the mammalia, or animals who suckle their young) there is a third indication to be fulfilled, viz., the keeping up of the necessary heat of the body, independent of changes in the external medium.

Bearing in mind these objects, we shall find they give the key to the appropriate variations in the circulating system I am about to notice.

In the very lowest forms of animal life no circulation exists. A good example is found in the hydra, or fresh-water polyp. Here the whole body consists of nothing more than a simple bag or stomach, furnished with tentacula for drawing food to its orifice. These tentacula are hollow, being in fact delicate tubes, the bore of the tube opening into the general cavity of the animal.

Now with such a structure it is evident that any apparatus for the circulation of nutrient fluid would be superfluous; since, every portion of the body being in direct contact with the nutrition contained in the digested aliment, every part may be said to nourish itself, inasmuch as by its internal surface, it absorbs the nutritive material, and by its external, in contact with the water in which it floats, the oxygen of the air required in assimilating it.

A little above this we have certain marine animals in which the want of a distinct system of circulation is compensated by the sea-water in which they live, being kept flowing in a continuous current through the body, carrying with it in solution the air and nourishment requisite for support.

We find this arrangement in some of the compound polyps; but it is perhaps best observed in the sponge.

On examining a living sponge, two sets of openings or pores will be seen; one set minute in size and of countless number, covering the surface generally; the other larger and fewer, placed at intervals, and usually elevated on prominent portions of the mass. The channels to which these

lead traverse every part of the interior, and may be looked on as analogous to the blood-vessels in higher classes ; for the nutrition of the sponge is effected by the surrounding water being continually sucked in at the smaller orifices, and as constantly discharged in equable and ceaseless streams at the larger ; thus insuring, by the most simple means, an uninterrupted supply of the organized particles which are diffused through the ocean, and on which the sponge lives, and an equally uninterrupted exit for those products of decay of which it is desirable to get rid.

From these simple forms of adaptation, and especially from the former, the transition is easy to the arrangement found in the class *Polygastrica*, which includes only microscopic animalcula. So inconceivably small are these infusoria, that it has been demonstrated by the Prussian physiologist, Ehrenberg, that water, when highly charged with them, sometimes contains 800,000,000,000 in one cubic inch, and that even then they occupy but one-fourth of its space, and thus have ample room to swim about at pleasure, without jostling or incommoding each other. Nevertheless, in spite of this minuteness, their organization is more complex than either of the preceding examples. The vascular and digestive apparatus is still, as in those, united, or rather the latter performs the functions of both in all three ; but here, instead of its presenting a simple membraneous bag forming the animal, it consists of a distinct intestinal canal running through the animalcule, from which on every side branch out towards the periphery flask-shaped pouches, into which the food passes, and is thus brought into relation with all parts of the mass. In some varieties the central tube is straight, in others tortuous, in a few it turns round to the point whence it started, and in one family of them the pouches or stomachs diverge at once from the mouth without the intervention of any canal at all.

Such are instances of the chief of those divisions of the animal kingdom, in which nutrition is effected without the existence of any distinct vascular system, by organs common both to the reception of the aliment and to its distribution through the various structures. We now come to the more elaborate and complex machinery of true circulation. Machinery, by the aid of which a small digestive cavity is enabled to supply a highly nutritious fluid to the most distant portion of the body, and by which, except in a few of the lowest forms, that fluid is also in its course freely exposed to the purifying and renovating influence of the air in a special and beautifully contrived apparatus.

Passing over several orders of marine animals, in which the existence or non-existence of blood-vessels is still a matter of dispute among comparative anatomists, we find the first distinct evidence of them in the class *Echinodermata*, of which the asterias, or star-fish of our own shores, is perhaps the most familiar example, and will serve by its description as type of the group.

This animal consists of a centre or body, and five rays, enclosed in a skeleton, formed of plates of calcarious matter, joined together by flexible ligaments.

This skeleton, or case, possesses in the rays considerable pliancy, but is nearly rigid in the body, at the centre of which, on the under or ventral aspect of the animal, it is pierced by an opening, the mouth, which leads to a membraneous cavity, the stomach, circular, and not prolonged beyond the limits of the body.

The rays are principally filled by organs called cæca, formed thus :— Opposite the junction of each, two delicate tubes, opening on the stomach, commence and run along to the point of the ray, there terminating in a blind extremity. From the sides of these are given off numerous sacculi, or pouches, which in turn, from their sides, give off other and smaller

sacculi, forming together what at first looks like a network of vessels, but when carefully unravelled presents the appearance I have described. The object of these cæca, two of which exist in each ray, is evident—they afford, by the reduplication of their membraneous walls, a vast increase of surface, on which the veins destined to absorb the chyle (or imperfect blood) may be spread out. We accordingly find their numerous folds covered with a delicate network of vessels, those of each cæcum converging to form a trunk, all of which trunks, at the junction of the rays with the body, pour their contents into a large vein running in a circle round the stomach. A short dilated tube, commencing from this, and so receiving the nutriment absorbed from the whole ten cæca, conveys it to another smaller vascular circle embracing the mouth, and from that, which is considered the main artery of the animal, the blood (as we now call it) is distributed to all the organs, the covering, the suckers or feet, the rudimentary liver, &c., concerning which it is not within the province of this lecture to speak.

In the star-fish no distinct apparatus of respiration is found ; but its want is compensated by the contact of these cæca with the sea-water admitted through pores in the surface of the ray ; so that the contents of the vessels absorb, through their delicate coats, the oxygen it contains in a state of solution.

In this, the simplest form of true circulation, you will observe there is no central organ of impulsion—no heart—the motion of the fluid in the vessels being solely effected by the contractile power of the vessels themselves, and by that chemical affinity existing between the blood and the tissues it is brought in contact with, which I shall hereafter explain.

From circulation without a heart, our next step in the inquiry is to investigate the first appearance of that organ.

In accordance with the law of progressive development which I mentioned, you will be prepared to hear, that, as we pass from one species to another, the transition from its absence to its presence is so gradual as to render it impossible to strictly draw the line of demarcation between animals *with* hearts and those *without* them. We find, on comparison, that one of the principal vessels of the body, situated on the back, and hence called the *dorsal vessel*, by degrees obtains a superior development to the rest, and more or less perfectly takes on the function of propelling the fluid throughout the circle by an alternate lessening and dilatation of its calibre. This propulsion is in more simple forms effected by the successive contractions, commencing at one end and passing in waves to the other, from the tail to the head of the specimen, something in the way you would draw the ring along a purse ; but as we ascend, this dorsal vessel becomes divided into compartments, furnished with communications between each other, which are guarded by valves, and shewing more and more completely the structure of a true heart.

The transition is seen in passing from one family to another of the class *Articulata*, commencing from its lowest division annelida (red-blooded worms) and proceeding to the higher one of insects, through what may be viewed as their connecting link, the myriopoda or centipedes.

The simple tube which, by its waves of contraction effects the circulation of the annelidans, requires no further notice, but the elaborate dorsal vessel of insects, with its divisions, its openings, and its valves, demands a little more of explanatory comment.

The best example we can take is the *Melolontha vulgaris*, or cockchafer, as it is the one which has been most closely examined, but, with some unimportant variations, the description, so far as is known, applies to insects in general.

The dorsal vessel, composed of distinct circular muscular fibres, is

widest in the abdominal region, but is continued through the chest into the head, where it terminates by an open extremity. It consists of eight distinct compartments, separated from each other by as many valves formed by folds of the lining membrane, and so disposed that the blood passes freely from the hinder chambers into those which are placed in front, but is prevented from returning in the opposite direction. Each compartment communicates by two wide slits, likewise guarded by valves with the cavity of the belly, so that fluids derived from thence readily pass into the different chambers, but cannot again escape through the same channel.

The movements of the circulating fluids produced by the contractions of this apparatus will therefore be as follows :—

The chyle, or nutritive material extracted from the food, exudes by a species of filtration through the walls of the intestine, and escapes into the cavity of the abdomen, where it is mixed up with the mass of the blood, which is not contained in any system of vessels, but bathes the surfaces of the organs immersed in it. When any compartment of the heart relaxes, the blood rushes into it from the abdomen, through the lateral valvular apertures ; and as it cannot return through that opening on account of the valves which guard the entrance, nor escape into the division immediately behind by reason of the valve which cuts off communication in that direction, the contraction of the dorsal vessel necessarily forces it on toward the head. When it arrives there, it of course issues from the open termination of the heart, but does not appear to be received by any vessels, and therefore becomes again diffused through the body.

The respiration of insects is effected in a manner equally beautiful, the air being diffused through every part, even the brain, in a series of delicate vessels, commencing from openings called *spiracles*, placed between the rings which form the external covering, so that the blood, instead of being purified in a separate organ during its passage, is supplied with air at every part of its course, and is consequently all arterial. This arrangement effects two things very necessary to an insect, namely, a large supply of oxygen to repair the rapid waste of tissue consequent on the activity of its movements, and great lightness of body, to allow of support and locomotion in the atmosphere without too great exertion.

A similar arrangement exists in the *Arachnida*, or spider tribe, except that neither so light a structure nor so free a supply of oxygen being required, the respiration is effected by an air-sac, or rudimentary lung limited to one situation, instead of being diffused throughout, and therefore the blood is necessarily contained in a system of vessels that it may be regularly carried thither in its course for purification.

The next class we pass to, comprises the *Crustacea*, or jointed shell-fish (improperly called "fish") which may be considered as the aquatic representations of the insecta and arachnida, and in which we meet with transition from the long tubular form of heart, to the more globular and compact form of higher animals. In the lowest crustacea, the heart is a long dorsal vessel, not very dissimilar in form and disposition to that of insects, but, as the spider, giving off arteries for the distribution of the blood, and receiving veins through which, when it has accomplished its circuit, it is returned, but as we rise to the more highly endowed species, we find the organ becomes more centralized. One of the highest individuals of the class, the *Astacus marinus*, or common lobster, will afford us a good instance. In this animal, the heart is found to be an oval viscus, situated in the mesian line of the body, beneath the hinder part of the large plate of skull which protects the upper surface of the head and chest. It is composed of strong muscular bands, and contains a single cavity of con-

siderable size. The contractions of this heart are very vigorous, and may readily be witnessed by raising the superjacent shell in the living specimen; several large arteries are derived from the above-mentioned simple heart, which pass in different directions, and give off branches of supply to the various structures.

The venous system is made up of large and delicate sinuses, that communicate freely with each other, and receive the blood from all parts of the body. Those of the dorsal region will serve to exemplify the arrangement. They are situated immediately beneath the shell, and consist of a large venous sinus, occupying the region of the head, a series of smaller ones covering the muscles of the posterior extremity, and an intermediate one placed over the heart, which, after receiving the contents of all the other chambers, pours them into that viscus by several short trunks, the terminations of which are guarded by valves to prevent regurgitation.

Such, then, is the vascular system of the higher crustaceans, which, in our ascending series, must be considered as giving the first and simplest form of the true heart, since the dorsal vessel of the insecta, arachnida, and others, can only be looked on as rudimentary.

Beyond this point, the chief differences of arrangement, bearing on the subject of the human circulation, consist of the perfecting of this organ step by step, in compliance with the necessities of the species.

The hearts of animals are generally divided into four classes, according to the number of cavities they contain, viz., "unilocular," "bilocular," "trilocular," and "quadrilocular" hearts.

As in the lobster just described, the unilocular, or one cavitied heart, consists of a hollow muscle, capable by contraction of forcibly expelling its contents, and furnished with two sets of openings; one set venous, guarded by valves which open only *inwards*, by which, when it *dilates*, the blood which has already circulated rushes in to fill it; the other set arterial, furnished with valves opening only *outwards*, by which, when it *contracts*, its contents escape to again perform the circuit.

This muscular bag answers to that part of the human heart named the ventricle (though, as we shall find hereafter, the work it performs is there, in common with other mammals and birds, divided between two such organs); and, therefore, since the simplest heart consists merely of a single ventricle, the ventricle, in the more compound heart of higher animals, is to be considered as the fundamental and most essential structure.

In animals whose heart is a simple ventricle, the veins which return the blood to it for recirculation are very large in proportion to the rest of the vascular system, as we have seen in the lobster. From this arrangement it follows, that the heart, when it has finished a contraction, is rapidly and easily again filled; but where the veins, as they approach the heart, remain small, this arrangement would be incomplete, since it would take too long an interval for them to pour in a sufficiency of blood.

To get rid of this difficulty Nature gives us the next form of heart—she attaches to the ventricle a reservoir called an auricle, into which the veins open, and which gradually dilates and fills during the contraction of the ventricle, so that when the latter is empty the former is full, and ready to pour into it without delay a fresh supply of blood, Such is the *bilocular*, or two cavitied heart.

You will then bear in mind that the function of the auricle is that of a *reservoir*, and the function of the ventricle that of a *force-pump;* and this combination of reservoir and force-pump constitutes a complete and perfect organ, since the more complex forms, as that of man, consist only of a repetition of these parts. Thus the trilocular heart is composed of two auricles and one ventricle, and the quadrilocular of two of each.

The multiplication of cavities results from the separating of the circu-

lation into two parts—the *pulmonic* division, in which the blood is purified—the *systemic*, in which this purified blood is distributed for the nutrition of the tissues.

The necessity of this separation for warm blooded animals becomes evident, when we remember the constant and rapid supply of highly oxygenated blood required to keep up their temperatures, and to furnish the means of repairing that ceaseless waste which ensues from the activity with which all their functions are performed.

The unilocular or bilocular heart may be either pulmonic or systemic, or a combination of both. If *pulmonic*, as in fishes, its office is to propel the blood for aeration to the gills or respiratory apparatus ; after which this purified blood finds its way throughout the body, and is returned to the heart, partly by virtue of its unexpended impetus, but principally by the contractility of the vessels themselves. If, on *the other hand*, *systemic*, as in the snail and oyster, the ventricle distributes the blood throughout the system, and on its re-collection it traverses the respiratory chamber, or the gills, just before again it enters the heart : in either case the blood, though pure, will travel comparatively slowly.

Lastly, If it be neither wholly pulmonic nor wholly systemic, but combining the two, the stream divides at each stroke of the heart, part going to the gills or lungs, part to the body in general. It is in this latter form of circulation that we meet with the trilocular, or three cavitied heart, as in reptiles, composed of two auricles (one *pulmonic*, receiving the blood from the organs of respiration—the other *systemic*, collecting it from the rest of the body) and one ventricle, receiving at the same time the pure blood from the pulmonic, and the impure from the systemic auricle, and by its contraction again propelling the mixture of the two throughout the circle. Here the blood, though more rapidly supplied, will be in a state of much less purity.

Now it is obvious that none of these arrangements would suffice for warm-blooded animals, since they require both a pure blood and a rapid circulation, and therefore Nature provides *them* with the last form, the quadrilocular, or four cavitied heart, which is simply the combining together of two bilocular hearts, one pulmonic and the other systemic.

Through such an organ the current will therefore be as follows :—The first auricle will receive from the veins the blood which has circulated through the body, and will then pass it into the first ventricle, which will propel it through the lungs, from the lungs having been there purified, it will re-collect in the second auricle and from thence be poured into the second ventricle, which, contracting, will again drive it throughout every part of the arterial system, from whence it returns by the veins as before.

Such, then, is a slight sketch of those principal varieties of circulation in the lower animal, which conduct us step to step from the simple polyp, destitute of even the least approach to the vascular system, up to the summit of the scale occupied by human organization.

For the cold-blooded animals, a simple and slow circulation we found in most cases sufficient ; but man, in common with other warm-blooded animals, requires an active and extended one.

From the large development of nervous system necessary to his reasoning powers, from the extent and perfection of locomotive organs requisite for his varied and habitual movements, and from the size of those complex viscera, the lungs, so essential to the maintenance of his high temperature, the digestive cavity is unavoidably small in proportion to the rest of the body, and remote from many of the organs ; yet, from the ceaseless waste of those organs consequent on the energy with which his functions are performed, an uninterrupted supply of nutriment and heat must be kept up to every region.

Nature effects this by the conversion of food into a semi-organized fluid,

blood; and the transmission of this from the heart through the arteries, capillaries, and veins, which permeate in vast numbers every portion of the animal machine.

The first part of this process, the manufacture of blood, will be considered in our next Lecture. The construction of the apparatus, *by* which and *through* which, it is continually kept flowing, first demands our attention.

The organs then of human circulation are—

1st. A muscular heart, consisting of four cavities, two of them for pulmonary and two for general or systemic circulation.

2d. Of three sets of vessels, viz.—

Arteries, carrying blood from the heart to the various structures.

Veins, returning the same blood back again to the heart.

Absorbents (of which I shall not require to speak till the next Lecture) which are divided into two sets, and may be considered tributaries to the venous system, and which do not carry blood at all.

In the *systemic* circulation the *arteries* carry *pure*, and the *veins impure*, blood. In the *pulmonary* it is *precisely the reverse.*

Lastly. In addition to these three sets, we might mention a fourth, the capillaries, which are minute vessels disposed at every part as an intricate network, and placed intermediate between the ultimate branches of the arteries which end in them, and the primary radicles of the veins which commence from them: but for all practical purposes that may be included in the arterial system, being viewed in the light of its final ramifications.

Of these structures the heart demands our first consideration.

The *position* of the heart in man is known to all by the phenomenon of its impulse; but we must nevertheless touch on it here in order to point out something of its relations with surrounding parts.

The inside of the trunk of the human body is crossed rather above midway by a thin partition or floor disposed in the manner of an arch, and named the diaphragm, which is attached in front and at the sides to the lower part of the ribs, and behind to the bones of the spine. This septum divides it into two unequal cavities or stories, as we may call them, since they are placed one above the other like the stories of a house, the upper and smaller one being the thorax or chest, the lower and larger the abdomen. Resting on the superior surface of this diaphragm, slightly to the left of the mesian line, and placed therefore nearly on the centre of the floor of the chest, lies the heart; the remainder of the thoracic space being principally occupied by the large vessels ending in and commencing from it, and by the lungs immediately surrounding it.

In shape it nearly resembles a short thick cone, having one of its sides on which it lies somewhat flattened. It is placed slantwise, so that the apex of the cone (which is the part we feel beating against the ribs) points downwards, forwards, and to the left, while the base from which the vessels spring, has, of course, a converse aspect, and looks upwards, backwards, and to the right; from this it is evident that the right or pulmonic side will be comparatively in front, and the left or systemic principally behind.

The organ itself and the origins of the vessels communicating with it are invested by a membraneous bag or purse, the pericardium containing a small portion of fluid, which, like the oil applied to machinery, diminishes the friction that ensues from constant motion, and the whole apparatus is *packed* (if I may use the expression) in the space between the two lungs.

The external surface is marked by two grooves, one running from base to apex, the other crossing this at right angles, and encircling the heart

near to its broader end. These lines divide it into four portions, which correspond with its four cavities: the transverse line marks the division of the auricles from the ventricles—the auricles being above, and therefore answering to the base, the ventricles below it and agreeing with the body and apex.

The downward line shows the separation of the pulmonary and systemic compartments.

These four chambers have each some points of difference from the others.

The Auricles are the thinnest and most flaccid parts of the heart, and are larger in capacity than the ventricles; by these circumstances they are adapted to their function as reservoirs. They have opening *into them* the veins which fill them with blood, and opening *from them* the communications by which they empty themselves into the ventricles; these communications are called the auriculo-ventricular orifices.

The Ventricles are smaller, firmer, and thicker, being thus fitted for the part they have to perform, viz., that of forcible propulsion. They have opening *into them* the aforesaid auriculo-ventricular orifices, by which they receive blood from the auricles, and opening *from them* the arteries, by which, when they contract, it escapes, and is distributed to its destination. The walls of the right ventricles are much thinner and weaker than those of the left, because the former has to force the blood only a short distance to the lungs, while the latter has to transmit it in every direction over the whole body.

The *principal* openings we shall see in the interior of these cavities will therefore be these:

Right Auricle.

Superior cava ..... } inwards.
Inferior cava .... } inwards.
Coronary vein .... } inwards.
Auriculo-ventricular orifice. .....outwards.

Right Ventricle.

Auriculo-ventricular opening .....*inwards.*
Pulmonary artery, or trunk of the pulmonic circulation ..... } *outwards.*

Left Auricle.

Four pulmonary veins... .....inwards.
Auriculo-ventricular opening .....outwards.

Left Ventricle.

Auriculo-ventricular opening..... .....inwards.
Aorta, or trunk of the systemic circulation .....outwards.

Some of the openings of the auricles, and all those of the ventricles, are guarded by *valves,* so arranged as to fall back and leave the passage free when the blood flows forward in its proper direction, but to close together directly it seeks to return.

These are divided into *active* and *passive*. The passive consist only of semi-lunar folds of the lining membrane, moved either in or out of position solely by the pressure of the blood; they are those of the—

Coronary vein .....single.
Pulmonary artery. ..... } triple.
Aorta..... }

The active consist, in addition to the fold of membrane forming the flap, and which is here strong, thick, and triangular (the base of the triangle to the edge of the opening) of small bundles of muscle or flesh, attached to their free points by tendinous cords, and pulling them into apposition when the ventricle contracts.

They are those of the two auriculo-ventricular openings :—

The right, or tricuspid .....triple.
The left mitral, or bicuspid .....double.

The tricuspid is also a safety-valve, since, should the cavity of the right ventricle become over distended with blood, as from a thinness of its walls it may, the right or yielding wall will, as it gives, carry with it the flap of the valve on that side, by means of its attachment to it, and thus open a channel for part of the contents to regurgitate, and so relieve the distension.

The caval and pulmonary veins have no valves.

The heart, like all other parts of the body, owes its capacity for active motion to the contraction of muscular fibres. These fibres make up nearly the whole thickness of the walls of this organ, with the exception of the lining and investing membranes ; they are arranged, as in other parts, in bundles, technically called *fasciculi*—the general direction of these fasciculi being spiral, winding as so many coils around the cavities.

Each fibre, in contracting, of course decreases in length and increases in thickness, and, therefore, from their spiral arrangement, two consequences follow their action ; the *first* will be a general compression exerted on the cavities they surround, so as to force the blood out of them ; the *second*, that the heart will be in a measure twisted, especially at the apex (where they are most spiral), in a direction corresponding to them, viz., from right to left, and from behind forwards, so as to jerk its point each time against the inner surface of the ribs : this constitutes the beating we feel on placing the hand against the chest.

The fibres of the ventricles are not continuous with those of the auricles, since their action is required to be alternate—the two ventricles contracting as the two auricles dilate, and *vice versa*.

It now only remains to speak of the blood-vessels, or vascular system.

The form of the vascular system is that of a tree. Thus, the lower part of the tree, in which the nutritive fluid flows from many roots, or rather radicles, into a single stem, will answer to the system of veins ; and the upper part, in which it passes from this single stem into many branches, will agree with the system of arteries. So close, indeed, is the analogy, that it has furnished to anatomy the language used in describing the difference between these two orders of vessels ; so that we define a vein to be a vessel in which the blood flows *from* many *radicles into* a single *trunk*, and an artery, one in which it passes from one trunk into many branches ; this constituting, in fact, the simplest and truest distinction between them; there are a few special exceptions, but the rule is very general.

The bore of the trunk of any vessel is always larger than that of any *one* of its branches, but smaller than that of the *whole of them*—consequently, the blood, when flowing from the heart, is passing, each time its stream divides, from a narrower into a wider channel, and *vice versâ* when flowing towards it. It is in this sense that the form of the vascular system is said to be that of a cone—the apex of which is at the heart and the base all over the body—the expression referring only to the fact that the aggregate capacity of the vessels increases in proportion as they recede from the centre of circulation.

The largest vessels are in general placed towards the centre of the body, and at the surface there are only found divisions of extreme minuteness, and even these are separated from the external parts by a layer of substance not possessed of vascularity.

The principal vessels, whether in the trunk or the limbs, usually lie in the direction in which the parts bend on each other, and there usually occur together an artery, one or two veins, and several absorbents, the whole being generally enclosed in a sheath common to all.

There are some points of difference to be observed between the various kinds of vessels. *First then of the Arteries.*

The Arteries are the cylindrical tubes which convey the blood from the ventricles of the heart to every part of the body. They are dense in structure, and preserve, for the most part, the cylindrical form when emptied of their blood, which is their condition after death. Hence they were considered by the ancients as the vessels for the transmission of the vital spirits, and were therefore named Arteries, which signify vessels containing air.

The artery proceeding from the left ventricle of the heart contains the pure or arterial blood, which is distributed by it throughout the entire system : this constitutes, with its returning veins, the greater or systemic circle. That which emanates from the right ventricle (pulmonary artery) conveys the impure blood to the lungs, and with its returning veins establishes the lesser or pulmonic circle. Thus the two circulations taken together form, as it were, the figure 8, the heart occupying the central point of junction.

The whole of the arteries of the systemic circulation proceed from a single trunk, named the *aorta*, from which they are given off as branches, and divide and subdivide to their ultimate ramifications, constituting the great arterial tree which pervades, by its minute subdivisions, every part of the animal frame.

The mode in which the division into branches takes place, is deserving of remark, from the aorta the branches for the most part pass off at right angles, as if for the purpose of checking the impetus with which the blood would otherwise rush along their cylinders from the main trunk ; but in the limbs a very different arrangement is adopted ; the branches are given off at an acute angle, so that no impediment may be offered to the free circulation of the vital fluid. The division of arteries is usually into two only, or as it is called "*dichotomous*" (thus ⅄) but in some few instances a short trunk divides suddenly into several branches, which proceed in different directions—this mode of division is termed *an axis.*

Communications between arteries are very free and numerous, and increase in frequency with the diminution in the size of the branches—they are called *inosculations* or *anastomoses.*

This increase in the frequency of anastomosis in the smaller branches is provision for counteracting the greater liability to impediment existing in them than in the larger ones.

Upon this free communication, existing everywhere between arterial branches, is founded the principle of cure in the ligature of large arteries ; the ramifications given off from the artery above the ligature inosculate with those which proceed from the vessel below it. These anastomoses enlarge, and constitute a *collateral circulation* in which several large branches perform the office of the single obliterated trunk.

Arteries are composed of *three coats*—external, middle, and internal.

The external, or cellular, is firm and strong, and serves at the same time as the chief means of resistance of the vessel and of its connexion to surrounding parts.

The middle is elastic and thicker than the external—its elasticity enables it to accommodate itself to the quantity of blood it may contain.

The internal is a thin membrane which lines the interior of the artery, and gives it the smooth polish which that surface presents. By its smoothness it diminishes, so far as is possible, the retarding influence of friction as the current of blood passes along.

These coats are not nourished by the blood contained in the vessel they surround ; but have separate little arteries of their own derived from neighbouring branches, which however do not penetrate beyond the middle coat.

The veins are the vessels which return the blood to the auricles of the heart after it has been circulated by the arteries through the various tissues of the body. They are much thinner in structure than the arteries, so that when emptied of their blood, they become flattened and collapsed ; after death they are found more or less distended with blood,

The veins of the systemic circulation commence by minute radicles all over the body from the capillaries in which the arteries end—they receive their contents, which have now become impure, and carry them to the right auricle. Those of the pulmonary circle in like manner receive from its capillaries the blood of the pulmonary artery, which has been purified, and transmit it to the left auricle.

Veins are divided into deep and superficial, according to their situation.

The superficial are unaccompanied in their course by arteries, and are usually those selected for venæsection.

The deep are generally in relation with arteries, being in many parts enclosed with them in a common sheath : the smaller arterial branches are usually accompanied by two of them, one on each side of the artery ; they are then named *venæ comites.*

They have the same coats as arteries, but much thinner and more delicate, and their anastomoses are even more frequent than those of the former vessels, which fact is evidently intended to obviate the obstructions to which they are especially liable from the thinness of their coats; and from their inability, owing to the slowness of their current to overcome much impediment. There is one great distinction between *them* and arteries, they are furnished at intervals with valves similar to the *passive* valves of the heart. This is a beautiful provision of nature, since the greater part of the venous circulation has to take place against gravity with a slow current, and in vessels with walls so thin as easily to become distended were the weight of their column of blood not taken off by this means. These valves are most numerous in the deep veins of the extremities.

The *capillaries* are placed intermediate between the terminal branches of the arteries, which end in them, and the commencing radicles of the veins, which begin from them. They are sometimes described as the terminating ramifications of the arterial system—more commonly as a distinct system of vessels. They are too minute to be visible to the human eye, but, examined under the microscope, they are seen to be arranged as an intricate network, distributed through every part of the body, so as to render it impossible to introduce the smallest needle point beneath the skin, without wounding several of these fine vessels. In them the various operations of secretion and nutrition take place, as we shall find at our next meeting ; and if we compare the growth and nourishment of the human fabric to the building up and repairing of a mansion, we may liken the *arteries* to a set of labourers who carry to the appointed spot the materials for the work ; the *capillaries* to the artizans and mechanics who fashion them into the required structure ; and the *veins* to another set of labourers, who take away again the waste and the rubbish which is no longer of use.

[Although anatomy does not come within the province of the Chemist, we think our readers will derive useful instruction from this lecture, as the subject is treated in a popular form, and contains merely such information as should be within the reach of all persons of liberal education. We make this remark to counteract the impression which might otherwise arise, that we are about to launch out into medical subjects, which is not the case.—Ed.]

ORIGINAL AND EXTRACTED ARTICLES

ON ACETIC ACID.

BY ANDREW URE, M.D., F.R.S.

(*Continued from page* 287.)

2. Wine vinegar is made of the best quality, and on the greatest scale, at Orleans in France, out of wines which have become more or less acidulous, and are, therefore, of inferior value. When the vinegar is made from well-flavoured wines, it is preferable to every other for the use of the table. The old method pursued in the *vinaigreries* consists merely in partially filling a series of large casks placed in three or four ranges over each other, in a cellar warmed with a stove to the temperature of 85° Fahr., with the wine mixed with a certain proportion of ready-made vinegar as a ferment. More wine is added in successive small portions as fast as the first has become acetified, taking care that a free ventilation be maintained, in order to replace the carbonic acid produced by fresh atmospheric oxygen. In summer, under a favourable exposure of the windows and walls of the fermenting room to the sun, artificial heat is not needed. Each cask is of about sixty gallons capacity, and the whole set is filled up one-third with vinegar, to which two gallons of wine are added, and weekly afterwards, two gallons more. About eight gallons are drawn off at the end of four weeks as vinegar, and then successive additions of wine are made as before to the casks. These are laid horizontally in rows upon their gawntrees, and are pierced at the upper surface of the front end with two holes, one called the *eye*, is two inches in diameter, and serves for pouring in the charges through a funnel; the other is a small air-hole alongside. The casks should never be more than two-thirds full, otherwise a sufficient body of air is not present in them for favouring rapid acetification. At the end of a certain period, the deposit of tartar and lees becomes so great, that the casks must be cleared out. This renovation takes place usually every ten years, but the casks when made of well-seasoned oak and bound with iron hoops, will last twenty-five years. The wine as well as the vinegar produced, should be clarified by being slowly filtered through beech chips closely packed in a large oaken tun. When wines are new, and somewhat saccharine, or too alcoholic, they acetify reluctantly, and need the addition of a little yeast or even water to the mixture, and when they are too weak, they should be enriched by the addition of some sugar or stronger wine, so as to bring them to a uniform state for producing vinegar of normal strength. To favour the renewal of fresh air into the upper part of the hogsheads, it would be advisable to pierce a two-inch hole near to the upper level of the liquid when the cask is fullest, by which means the heavy carbonic acid would fall out, and be replaced by the atmospheric air at the superior apertures.

I have had occasion to examine professionally the best wine vinegars imported into this country from Orleans, and I found their specific gravity to be about 1.019, and their percentage of acetic acid hydrate (crystalline acid) to be from $6\frac{1}{2}$ to nearly 7. One or two samples were supposed to contain acetified cyder. This adulteration may be tested by neutralizing the vinegar with ammonia, and then adding solution

of acetate of lime. Tartrate of lime is of course precipitated from the wine vinegar, while the pearly malic acid of the cyder affords no precipitate with the lime, but may be detected by acetate of lead, by the glistening pearly scales of malate of lead, hardly soluble in the cold.

3. Alcohol vinegar.—This species has been hitherto manufactured chiefly in Germany, having commenced soon after Döbereiner's fine discovery of the combustion of alcohol into acetic acid by the agency of *platinum mohr*. Under a large glass bell, he placed on shelves, an inch or two apart, several saucers, containing spirits of wine, with slips of blotting paper so suspended as that their lower edges dipped in the spirits. Over and alongside of these saucers, other smaller ones were set, containing the black platinum powder moistened with the spirits. The apparatus being exposed to the sunshine, or even put into an apartment moderately warm, a copious formation of vapours takes place, with a manifest increase of temperature, and streaks of condensed fluid run down the sides of the bell into the subjacent basin. This fluid is acetic acid, resulting from the acidification of the elements of the alcohol by the oxygen of the atmospherical air included. This interesting transformation ceases with the exhaustion of the oxygen, but it may be renewed from time to time by renovation of the air. One atom of alcohol $= C_4 H_5 O + H O = 46$ parts; in which compound, two atoms of hydrogen being replaced by two of oxygen, we have $46 + 14 = 60$ parts, or one atom of hydrated acetic acid. Hence we see that 46 parts of absolute alcohol afford 60 of radical vinegar: 100 parts therefore afford 130, and require for this conversion nearly 70 parts of oxygen, allowing two atoms of oxygen for the abstraction of the two atoms of hydrogen. Since air in round numbers contains a little more than one-fifth its volume of oxygen, then 1000 cubic inches will contain upwards of 200 of oxygen, which will weigh fully 70 grains, being the quantity requisite for the transformation of 100 grains of alcohol into acetic acid in the above process. Two atoms of water are also formed, equal to 18 grains. In practice, it is found that weak alcohol answers best. With a box of 12 cubic feet capacity, and with 7 or 8 ounces of platinum mohr properly distributed, one pound of alcohol may in the course of a day be converted into pure vinegar, fit for every purpose of the kitchen or the Chemist. I have examined the vinegar manufactured from spirits, and found it to be excellent, as it contains no gluten, and it is therefore not liable to change. It is not possible in this way to make a strong acetic acid, nor can it be made at all on the large scale in this country, on account of our revenue laws.

In the sequel of Döbereiner's discovery, another German Chemist, M. Schutzenbach applied the principle of oxigenation to beers and other alcoholic liquors, for the purpose of converting them rapidly into vinegar; and about the same time M. Wagenmann contrived his *graduator*, or *essigbilder*, a simple apparatus for the quick vinegar manufacture. It consists of an oaken tub $5\frac{1}{2}$ feet high, $3\frac{1}{2}$ feet wide, and three at bottom, set upon a wooden frame about fourteen inches from the floor. Fifteen inches above the bottom, the tub is pierced with a horizontal row of eight equidistant holes, one inch in diameter. Five inches beneath the mouth of the tub a strong beechwood hoop is fastened to the inner surface, in order to support a circular oaken shelf, the space round the edge of which is stuffed tight with hemp. This shelf is perforated with at least 400 gimlet-holes, of about one-eighth

of an inch, through each of which a porous cotton wick is let down several inches, hanging by a knot in the top of the hole at its upper end. In the same circular shelf there are four holes, one and a half inch in diameter, and eighteen inches apart, into each of which is fixed tight the middle of a stout glass tube about four inches long. These tubes favour the circulation of the air admitted by the circumferential holes. One inch above the bottom of the tub, a hole is pierced for the reception of a syphon of discharge, the top curvature of which must stand about one inch below the holes in the side of the tub, to prevent the liquor collected, to the depth of about twelve inches on the bottom, being spilled. Into the empty space over this liquor, the bulb of a thermometer is placed, while the stem and scale project to show the interior temperature. Beneath the lower outer leg of the syphon a reception cistern is set. The mouth of the tub has a wooden lid, with a funnel fixed in its middle for the introduction of the liquor to be acetified. The whole capacity of this tub, from the bottom up to within one or two inches of the perforated shelf, is to be filled up with shavings of beech-wood (previously boiled in water), or with grape-stalks, or birch-twigs, all well soaked with vinegar. This apparatus being placed in an apartment, heated to from 80° to 100° Fahr., is to have its uppermost compartment filled with the liquor. This slowly filters down through the cotton wick threads, thence over the surfaces of the chips or stalks, and, finally, into the subjacent receiver, having been exposed in its transit very freely to the air. The ordinary acetifying mixture consists of eight parts of proof spirits, twenty-five parts of river-water, fifteen parts of good vinegar, and fifteen parts of clear beer or wine. The water should be heated to about 150° before the other ingredients are added to it, whereby the mixture acquires a genial temperature. After this has been all transmitted through the apparatus, it will be found imperfectly acetified, and therefore must be passed through once or twice more. And since the more alcohol that is present the slower is the process, it is advisable to keep back a part of the spirits at first, and to add it in the subsequent transmissions. The wash-cistern, which contains the acetifying mixture, should be supported on a shelf near the ceiling of the stove-heated apartment, in order to be kept constantly warm. After the first operation is completed, the interior of the cask becomes so active an oxidizer, that the addition of vinegar to the mixture is no longer necessary; but care should always be taken to have it as well clarified as possible, in order to prevent the deposition of much gluten upon the beech-chips. Dr. Kastner prescribes the following manner of making a malt wine for the quick vinegar process:—Crush together 80 pounds of pale barley malt, and 40 pounds of pale wheat malt, and infuse them in 150 quarts of water of 122° Fahr., and afterwards mash them properly with 300 quarts of hotter water. The wort thus made is to be cooled, drawn off from the grains, fermented with yeast for three days, then the beer is to be barrelled up for use.

I have already adverted to the quick acetification of malt-wort by Mr. Hams's patent process. This has been mounted upon a large scale of late years, the air for oxigenating the alcohol of the wash, previously fermented with yeast, having been supplied from two gasometers, alternately moved by steam-engine power. Two main defects attend this quick process, which are, that as the materials are not thoroughly

acetified, the product must be left for some time to ripen in casks, and the resulting vinegar has not the flavour of that slowly made in the old way. I am informed that a vinegar, equivalent not merely to five and a half per cent. has been produced, but one five times stronger, by operating with an apparatus thirteen feet high, fourteen wide at bottom, and fifteen at top, in which an adequate temperature is generated, during the oxidation of the great mass of materials, without artificial warmth.

4. Wood-vinegar is so called because obtained from wood alone, and in its crude state, *pyrolignous acid*, because produced from wood by the agency of fire. Beech, oak, and other hard woods afford the best products. Cut into billets two or three feet long, they are packed into an iron cylinder from six to seven feet long, and from three to four feet in diameter, laid on its side. Two such cylinders may be built into one furnace, with the fire-place in the middle beneath, but screened from its strongest flame by a bed of refractory clay tiles, on which they repose. The front end of these retorts is closed by a disc of cast iron, smeared round the edges with moist loam, and secured to projecting bolts of wrought iron by wedges. The back end is also closed with a cast iron disc, which is fast bolted on it, but in its centre there is an orifice eight or nine inches in diameter, to which a copper pipe of that size is secured. This is the commencement of the condensing tubes, which are plunged into a water-tank, and are prolonged zigzag-wise to a considerable length, so as to effect complete condensation of the acid vapours. The extremity of the pipe pours out its liquids into a suitable tank. These consist of tar and pyrolignous acid, the former of which subsides to the bottom, the latter is pumped or run off and purified, first by re-distillation in large copper alembics, and afterwards by saturation, either with quicklime, chalk, or soda, according to circumstances. In any of these cases, the re-distilled acid is heated in a copper pan to near the boiling point, and skimmed to separate some tarry matter, a separation which is promoted by the clarifying power of a little bullock's blood mixed in with the cold liquor. The acid is to be saturated by sprinkling into it, in the hot state, slaked and sifted quicklime. I have obtained a purer pyrolignite of lime by using chalk, because the quicklime seems to render a good deal of the tar soluble. When acetate of soda is to be made, I have seen reason to prefer the direct saturation of the clarified acid with the now-economical pure soda-ash, than to produce it by decomposing the above-made acetate of lime with sulphate of soda—a decomposition which is always incomplete, as a considerable quantity of both the sulphate of soda and acetate of lime remain in the mother liquor over the crystals of pyrolignite of soda, obtained from the materials after due evaporation and refrigeration. The crystals obtained should be drained, re-dissolved, the solution clarified by a little bullock's blood, evaporated to the proper point, and re-crystallized. This acetate being drained dry, is to be fused in a slightly concave-bottomed cast-iron pan, till all the tarry and oily matter be decomposed, a process which requires a well-regulated heat of about 500° Fahr., and many precautions to prevent the destruction of the salt, for at a certain heat it takes fire, and burns all away like tinder. During the igneous fusion of the salt, the mass must be constantly stirred with iron rakes to equalize the calcination of the crudities. No empyreumatic smoke should be

suffered to rise. Whenever the whole flows smoothly like oil, and ceases to froth, the fire is to be withdrawn from beneath the pan, and the contents are to be ladled out into moulds. When these are nearly cold, they are to be dissolved in water, the solution allowed to settle clear or filtered, and then evaporated and crystallized. From twelve to twenty-four hours are requisite for completing this fusion process upon half a ton of the rough salt. Eight hundredweight of dry wood affords, at first, thirty-five gallons of crude pyrolignous acid of specific gravity 1.025, weighing about 300 pounds; and the residuary charcoal weighs no more than one-fifth of that of the wood, so that out of 800 pounds, 460 pounds are obtained, and 340 pounds are dissipated in gases and vapours. These results have been verified by myself in a large and well-conducted factory. The charge made early in the morning is exposed to ignition during the day, but the fire is slackened during the night, so as to allow the charcoal to be raked out into (and covered up in) sheet iron boxes in the morning, to cool before being packed away in the store. Two hundredweight of coals serve to decompose the contents of two retorts. In the rectification of that acid, 20 gallons out of 100 remain in the state of tar in the bottom of the still. The acid has now a specific gravity of 1.013, and is about one-third stronger than revenue proof vinegar. It affords about one per cent. of wood-spirit in its re-distillation. The first acetate of soda solution should have a density of 1.23 before setting it aside to crystallize.

Many attempts have been made to get rid of the tarry impurities by calcining the dry pyrolignite of lime, but never, I believe, with any good effect.

The apparatus used in France, for decomposing wood into pyrolignous acid, is a large cylinder of rivetted sheet iron, set upright in an oven chamber a little larger than itself, at the bottom of which the fire is applied at first, till the combustible gases are freely discharged from the wood, when these, conducted by a pipe to the fire-place, are set burning under and round the cylinder in numerous jets. The cylinder is lifted out by tackle when the decomposition is completed, and a new one hoisted into its place. The condensation of the vapours of the crude acid is accomplished by passing them downwards through a zig-zag copper pipe, while a current of cold water is caused simultaneously to ascend in an iron pipe surrounding the copper one, being the condenser for which Messrs. Taylor and Martineau obtained a patent about thirty years ago in this country, and of which one branch has been since called Liebig's condenser, and as such is much used in experimental laboratories. The outside of these iron plate cylinders, being daubed with lime from time to time, are so well protected from the fire that they last from four to five years. Whenever the tube, that passes off from the upper end of the cylinder, becomes so cool as not to evaporate water very rapidly, it shows that the process of decomposition is finished. The only use to which the tar thus obtained is applied is that of fuel. It is insoluble in coal naphtha and oil of turpentine, but very soluble in wood spirit.

The best method of extracting acetic acid from the pure acetate of soda is as follows:—One hundred pounds of the pulverized salt being put into a hard glazed stoneware receiver, or deep pan, from thirty-five to thirty-six pounds of concentrated sulphuric acid are poured in one

stream upon the powder, so as to flow under it. The mixture of the salt and acid is to be made very slowly, in order to moderate the action and the heat generated as much as possible. After the materials have been in intimate contact for a few hours, the decomposition is effected; sulphate of soda in crystalline grains will occupy the bottom of the vessel, and radical vinegar, or acetic acid (hydrate), the upper part, partly liquid and partly in crystals. A small portion of pure acetate of lime, added to the acid, will free it from any remainder of sulphate of soda, leaving only a little acetate in its place; and though a small portion of sulphate of soda may still remain, it is unimportant, whereas the presence of any free sulphuric acid would be very injurious. It is easily detected by evaporating a little of the liquid, at a moderate heat, to dryness, when that mineral acid can be distinguished from the neutral soda sulphate. This plan of superseding a troublesome distillation, which is due to M. Mollerat, is one of the greatest improvements in this process, and depends upon the insolubility of the sulphate of soda in acetic acid. The sulphate of soda thus recovered, and well drained, serves anew to decompose acetate of lime; so that nothing but this cheap earth is consumed in carrying on the manufacture. To obtain absolutely pure acetic acid, the above acid has to be distilled in a glass retort. That acid, in its crystallizable state, boils at 230° F., or 110° C, by my experiments made with a pure acid prepared by M. Lémire, of Paris: others have rated its boiling point 114° and even 120° C.

The following table of the specific gravities of acetic acid, of successive strengths, is the result of a series of experiments made by me in Glasgow, in May, 1819; the solution of the crystallizable hydrate being reckoned 100:—

Acid.	Spec. Grav.	Acid.	Spec. Grav.	Acid.	Spec. Grav.
100.....	1.0620	76.....	1.0743	52.....	1.0617
98.....	1.0650	74.....	1.0740	50.....	1.0603
96.....	1.0680	72.....	1.0733	45.....	1.0558
94.....	1.0700	70.....	1.0725	40.....	1.0512
92.....	1.0715	68.....	1.0716	35.....	1.0459
90.....	1.0728	66.....	1.0712	30.....	1.0405
88.....	1.0730	64.....	1.0701	25.....	1.0342
86.....	1.0735	62.....	1.0687	20.....	1.0282
84.....	1.0738	60.....	1.0675	15.....	1.0213
82.....	1.0740	58.....	1.0665	10.....	1.0147
80.....	1.0750	56.....	1.0647	5.....	1.0075
78.....	1.0748	54.....	1.0634		

In *Berzelius's Jahres berichte*, xvi. 192, the table of Van der Toorn is given for the successive quantities of dry acetic acid, corresponding to successive densities. He rates the specific gravity of the hydrate at 1.0570, being the acid which contains 85.11 of dry acid. In my table the equivalent hydrate is marked 1.062, a gravity as low as is probably to be obtained by weighing a solution of the drained crystals. An acid of 1.0698 contains, according to him, 51 of the dry; while an acid of 1.0675 corresponds, in my table, to 60 of the hydrate, or 51 of dry acid. In general his gravities are a little greater than mine at corresponding degrees of acid strength. The above numbers in my table are experimental, not interpolated from a few points, and may, I hope, be relied upon. The greatest density seems to be produced when

2 atoms of water = 18, are mixed with one of the hydrate = 60, or 23 with 77, at which dilution the specific gravity is nearly the greatest in my table; but at these stages of dilution the differences of density are very small, and minute errors may have occurred. When 6 atoms of water are added to one of the hydrate, making 7 atoms of water in all, then the acid acquires its primitive liquid density of about 1.062. A curious analogy exists in this respect with nitric acid, which suffers the greatest degree of condensation, in the series of its dilutions, when one atom of the real acid is combined with 7 atoms of water.

Pure acetic acid possesses a peculiar pungent, though not disagreeable smell, and a strongly acid taste. It crystallizes in needles and plates when cooled to 55° F., and melts when heated to 61°. The specific gravity of the crystals (taken by means of spirits of turpentine) I found to be 1.135 at 55° F. The vapour of the boiling acid is highly combustible, and burns with a blue flame. Acetic acid hydrate dissolves camphor, gliadine, resins, the fibrine of blood, and several organic compounds. When its vapour is conducted through a gently ignited porcelain tube, it is converted entirely into carbonic acid and aceton, an atom of the acid being resolved into an atom of each of the resultants. At a white heat the acid vapour is converted into carbonic acid, carburetted hydrogen, and water. The acetates comport themselves at elevated temperatures differently according to the strength of affinity between the acid and the base. When this is weak the acid escapes unchanged, and the stronger it is, the more acid is converted into aceton. Acetate of barytes affords most of this spirituous liquor, and next to it the alkaline acetates and acetate of lead.

Acetate of copper yields, at a heat of 400° or 500°, a concentrated acetic acid, mixed with some aceton. This process was formerly employed for preparing radical vinegar, as also that of decomposing acetate of lead by sulphuric acid; but both are now renounced for the process by acetate of soda above described.

Acetic acid is a pretty stable compound, as is evinced by its compound with soda and potash bearing the heat of 600° F. without decomposition. Acetate of potash and soda, dissolved in much water, readily mould and decompose; but acetate of ammonia is not liable to change in close vessels. When acetic acid is distilled along with peroxide of manganese and sulphuric acid, it is converted into formic acid. Iodic acid has the same effect with precipitation of iodine: it reduces gold from its chloride without disengagement of carbonic acid; but it does not reduce mercury from its nitrate or sulphate, as formic acid does.

The simplest reagent for purifying common vinegar is recently calcined wood charcoal, in fine powder; with which it may be digested, or, what is better, distilled, whereby a portion of the water comes over first, and may be got rid of, while the stronger vinegar is a later product. Attempts are often made to give wood vinegar the flavour of that made from wine, by adding acetic ether, wine, &c., but never with complete effect. The best disguise is obtained by mixing in some highly-flavoured Orleans vinegar. Malt vinegar, prepared by very slow fermentation in the air, acquires a peculiar ethereous odour, which cannot be imitated artificially, and hence persons accustomed to the flavour of such vinegar, by itself or in pickles, do not relish the

vinegar made by the quick oxidizement process, either from malt or spirits. Even subjecting this vinegar to the action of rape accomplishes imperfectly the object in view.

Were vinegar pure, it could be valued by its specific gravity alone, which at all strengths under fifty per cent. gives exact indications; but this is seldom the case, for ordinary vinegar contains more or less gluten and other organic matter, such as caramel or burnt sugar, to colour and flavour it, besides sulphuric and possibly other acids. Hence the Excise have adopted the following plan of acetometry, suggested by Messrs. Taylor. When pure vinegar is saturated with quicklime, the liquid takes a density double of that due to the acetic acid present. Thus, an acetate of lime, of specific gravity 1.018, corresponds to a pure vinegar of 1.009: but malt vinegar of that strength has its density raised to 1.014 by the gluten. When such vinegar is saturated with quicklime, the acetate acquires a specific gravity of 1.023, from which, if the five due to the gluten be deducted, the remainder, 1.018, will be the double of the true density. Revenue proof vinegar, called No. 24, has, according to these gentlemen, the

Specific gravity	1.0085,	and contains,	of real acid,	5	in 100.
"	"	1.0170	"	"	10	"
"	"	1.0257	"	"	15	"
"	"	1.0320	"	"	20	"
"	"	1.0470	"	"	30	"
"	"	1.0580	"	"	40	"

The acid of this table is the anhydrous, being stronger by about 15 per cent. than that of my table given above. The chemical analysis of vinegar consists first in determining the presence and proportion of foreign matter. With this view 500 grains of it should be evaporated by the heat of a chlorcalcium bath, the residuum weighed and examined. If it be sour, sulphuric acid may be suspected, and its amount be ascertained by precipitation with nitrate of barytes, and weighing the washed and dried precipitate. Every 118 parts indicate 49 of oil of vitriol; but if saline sulphates be present, their amount may be ascertained by igniting the above residuum and weighing what remains. The loss in ignition will be due to organic matter, acetates, and sulphuric acid. If an alkaline acetate be present, after ignition, the residuum may be an alkaline carbonate. Nitric acid is best detected by adding a few drops of a dilute sulphate of indigo to the vinegar, and by boiling the mixture, when the blue will pass into a dirty brown yellow if nitric acid be present. In common cases a ready mode of estimating the strength of the vinegar is wanted, and no re-agent is better for the purpose than the bicarbonate of potash, two grains of which are equivalent to very nearly one of anhydrous acetic acid. To 100 or 1000 grains of the vinegar in question we have only to add from a weighed parcel of pounded bicarbonate of potash enough to produce neutralization by the test of litmus paper, and the half number of grains required denotes the number of grains of acetic acid in 100 or 1000 of the vinegar. Or a normal solution of the bicarbonate may be kept ready made, of which 1000 water grain-measures contain 100 of the salt; then each twenty grain-measures expended in neutralizing 1000 water grain-measures of the vinegar denote one grain of real acetic acid. As the extrication of carbonic

acid from the bicarbonate is apt, however, in common hands, to cause fallacies, I prefer ammonia as a general acidimetrical test, of which 1000 water grain-measures of specific gravity 0.992 neutralize exactly one atom of acetic acid; that is, 51 grains of the anhydrous or 60 of the hydrate; therefore after adding that test ammonia to the vinegar faintly reddened with litmus, out of a graduated glass tube till the neutral tint of colour be hit, the number of water grain-measures of test expended, being multiplied either by 51 or 60, will give for a product the per centage of anhydrous or hydrated acetic acid. This is the method I have pursued for very many years, and which gives results of perfect precision in a few minutes.

Vinegar is so extensively employed as a condiment, that it should be of better quality than is commonly on sale in the United Kingdom, where it is almost always contaminated with oil of vitriol. All our pickles participate in the same noxious ingredient. The fumes of vinegar, and even its odour, as in the Vinegar of the Three Thieves of Marseilles, were long supposed to be counteractive of contagion in sick rooms; but they are rather injurious, by covering unwholesome smells from want of due cleanliness and ventilation, and should never be relied upon. In combination with alumina and also with oxide of iron, it is extensively used in the dyeing and printing of cotton, under the names of red liquor and iron liquor, as mordaunts for bright and dark colours.

According to Döbereiner and Liebig, in the conversion of alcohol into acetic acid, no carbonic acid is formed. 100 pounds of alcohol, consisting of 52.6 carbon+12.9 hydrogen+34.5 oxygen, absorb from the air, in the process of acetification, 35.2 pounds of oxygen, which abstract 4.4 pounds of hydrogen from the alcohol, and thus generate 39.6 pounds of water, leaving the substance called aldehyde (dehydrogenated alcohol), which consists of 52.6 carbon+8.5 hydrogen+34.5 oxygen=95.6 pounds. If we add to this, by free exposure to air, 33.9 pounds of oxygen, we shall have, in the whole, 129.5 pounds of acetic acid-hydrate, composed of 52.6 carbon+8.5 hydrogen+68.4 oxygen.

In practice we cannot obtain so much acid as the above, but the theoretical maximum serves as a beacon, and the nearer we can approach to it the better. About 3600 cubic feet of air contain 69 pounds of oxygen, the quantity barely necessary for acetifying 100 pounds of alcohol; but as the air is only partially stripped of that element, much more is needed, and this excessive current carries off some alcohol, aldehyde, and acetic acid, and so lessens the product. If, on the other hand, air be too sparingly supplied, volatile aldehyde is chiefly formed, which flies off, and leaves a mawkish putrefying liquor of no value.

We may complete the preceding view of the production of acetic acid, by showing the relations which subsist between it and sugar and starch through the medium of alcohol—four correlative compounds. 100 pounds of cane sugar are convertible into 100 pounds of starch sugar or grape sugar, by boiling it with sulphuric or tartaric acid, and abstracting the acid by means of chalk; and that weight of either kind of sugar is capable of yielding, by fermentation, 53.7 pounds of alcohol. 100 pounds of starch, if well saccharified, should afford fully 100 pounds of starch sugar, and, therefore, 53.7 pounds alcohol. These are the theoretical quantities, but they can never be realized in practice.

A quarter of good malt, weighing 320 pounds, contains, by my experiments, 144 pounds of solid extract, which should yield, first, 69½ alcohol, and next 100 pounds of acetic acid-hydrate, equivalent to seventeen times that weight of revenue proof vinegar=170 gallons nearly.

24, *Bloomsbury Square.*

(A Correspondent makes the following inquiry on the above subject) :—

In the article on Acetic Acid, contained in the last number of the Journal, it is stated that "a mixture of alcohol vapour and air, under the influence of the same sponge (platinum sponge), is converted by a true oxidation of the ether (of the alcohol), first into aldehyde, and afterwards into acetic acid." These words imply, that all that is necessary for the conversion of the ether of the alcohol, first into aldehyde, and afterwards into acetic acid, is an additional quantity of oxygen ; whereas it appears to me, that it is not by oxidation, but by *de-hydrogenation*, that the ether is converted into aldehyde ; and afterwards, by *oxidation*, the aldehyde is changed into acetic acid.

May not the conversion of ether into aldehyde be occasioned by the platinum sponge determining the combination of two equivalents of the hydrogen of the ether with two equivalents of the oxygen of the air, to form water?

Answer.—The oxygen, according to Liebig, Dumas, and Berzelius, first takes from the ether of the alcohol an atom of hydrogen, so as thereby to form aldehyde, and next it oxygenates the aldehyde into acetic acid. See the conclusion of the article on Acetic Acid, p. 336, near the bottom.—A. U.

ON THE MICROSCOPIC VEGETATIONS DEVELOPED IN PHARMACEUTICAL LIQUIDS.

BY JONATHAN PEREIRA, M.D., F.R.S.

I AM anxious to draw the attention of the readers of the *Pharmaceutical Journal* to the microscopical appearances of the vegetable forms developed in or upon various pharmaceutical liquids. The formations referred to, are cryptogamic plants of a very simple structure, belonging to the families *Algæ* and *Fungi*. They are produced in a very large number of solutions, organic and mineral. Few organic liquids, especially those of vegetable origin, suffer spontaneous decomposition without presenting them, and, indeed, to their agency fermentation has been ascribed. The subject has not hitherto attracted the attention which it deserves; but I hope, by bringing it specially under the notice of the readers of this Journal, to excite more interest in, and to draw the attention of Pharmaceutists to, this curious department of natural history.

It is little more than twenty years that the subject has excited much attention among naturalists. In 1826, Desmazières described and figured in a pamphlet published at Lisle, the yeast or fermentation fungus, which he denominated *Mycoderma Cervisiæ*. This paper was reprinted in the *Annales des Sciences Naturelles* (t. x., p. 42—67). In 1832, Biasoletto, an Apothecary at Trieste, drew attention to the minute plants developed in many solutions and infusions, by the publication of a small work, entitled *Di alcune Alghe microscopiche*,

8vo, c. tab. In 1834, Kützing* found in the *Tinctura rhei aquosa*, Ph. Bor. (an infusion of rhubarb in a solution of carbonate of potash, flavoured with spirit of cinnamon) an algaceous plant, which he denominated *Cryptococcus Infusionum* (see the *Journal für prakt. Chemie*, vol. i., p. 475; also *Pharmaceutisches Central Blatt*, 1834, p. 637). The same author, some years afterwards (1837) published his microscopical researches on yeast and mother of vinegar, and on some other vegetable formations. This paper appeared in the *Journal für prakt. Chemie*, xi., 1847; and a French translation (abounding in typographical and other errors) was published in Gaultier de Claubry's *Répertoire de Chemie*, t. iii., 1838.

About the time of the appearance of Kützing's paper, the attention of Chemists and Botanists was especially drawn to the yeast plant, by several important papers published by Cagniard-Latour and Turpin (*Comptes rendus*, 1837, p. 905; *Bibl. Univ. de Genève*, Nov., 1838), Schwann (Poggendorff's *Annalen d. Physik. u. Chem.* B. xli., 184), Quevenne (*Journ. de Pharm.* t. xxiv.), and Turpin (*Mémoires de l'Académie Royale des Sciences de l'Institut.* t. xvii., 1840). To this subject we shall hereafter revert.

Of late great interest has been excited amongst medical men respecting microscopic vegetations as the causes of many important diseases. During the present year a very interesting *resumé* of all that is known on this subject has been published by M. Robin in a work entitled *Des Vegetaux qui croissent sur l'Homme et sur les Animaux vivants*, to which we beg to refer our readers. The author describes eighteen vegetables found on man; of these six only are true parasites or *epiphytes*, the remaining twelve being vegetables which grow on decomposing animal matters found on the surface of his body. The six true epiphytes are—

1. The fungus of tinea.
2. That of *Porrigo scutulata* (Lebert). *Herpes tonsurans.*
3. That of *Porrigo decalvens* (Gruby).
4. That of the roots of the hairs in *Herpes tonsurans* (Cazenave).
5. That of *Plica polonica* (Guensburg).
6. That of mentagra.

Several of the most distinguished writers on Algæ believe in the conversion of the lower forms of these plants into more highly organized species. Nay, Kützing asserts the capability of their conversion into genera of altogether different families and classes of higher cellular cryptogamic plants! (*See* Link's *Report on the Progress of Physiological Botany for the Years* 1842 and 1843). These assertions are too astounding to receive ready credence; and the observations on which these assertions are founded—

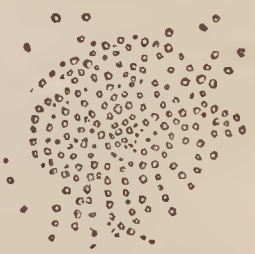
"Cannot be considered conclusive, apart from all prejudice either way, till a certain number of bodies, ascertained to be precisely of the same nature, be isolated, and the changes of these observed with every possible precaution to avoid error."—*Rev. M. J. Berkeley.*

* Kützing, who is teacher of natural history at Nordhausen, published in 1843, the *Phycologia naturalis*, or the anatomy, physiology, and systematic arrangement of algæ (4to, with eighty coloured engravings) a work, which, in the opinion of Link, "constitutes an epoch in the knowledge of algæ, and is a considerable advance in science."

I now proceed to describe the vegetations found in various solutions, organic and mineral, and in doing so shall freely avail myself of the writings of Kützing and other naturalists.

1. *Vegetation in Mucilago Cydoniæ.*—When quince mucilage has been kept for several days, in the summer, a flocculent mucilaginous agglomerated substance forms in it, while the remainder of the liquid loses its mucosity and becomes more fluid. Litmus paper is strongly reddened by it. When the mucous flocculi are examined by the microscope we find them to consist of very small aggregated mucilaginous globules, such as are represented in fig. 1 (from Kützing).

Fig. 1.



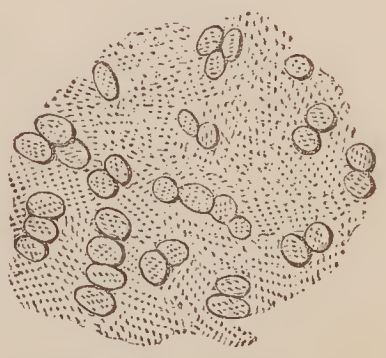
Vegetation in Quince Mucilage.

2. *Vegetations in Distilled Waters.*—It is a fact, with which Pharmaceutists have been acquainted from a very remote period, that distilled waters, when kept sufficiently long, lose their proper odour, and acquire a musty or mouldy one, quite different from the former.

Kützing submitted to examination several of these distilled waters, which had become thus altered, and observed, that their re-action was always acid; at least this was the case with respect to *raspberry-water*, *valerian-water*, and *elder-water*. But it also frequently happened that these altered waters contained mucilaginous flocculi suspended therein, and sometimes also deposited on the walls, or the bottom of the vessel.

These mucilaginous flocculi are vegetable formations, which have been described and figured in Biasoletto's already quoted work. M. Agardh has likewise described several of them in his *Systema Algarum*, for instance, those formed in *sage-water* and in *rose-water*. In 1833, Kützing called attention to the fact, that distilled waters, when they become mucilaginous, invariably lose, more or less, the odour peculiar to the essential oils.

Fig. 2.

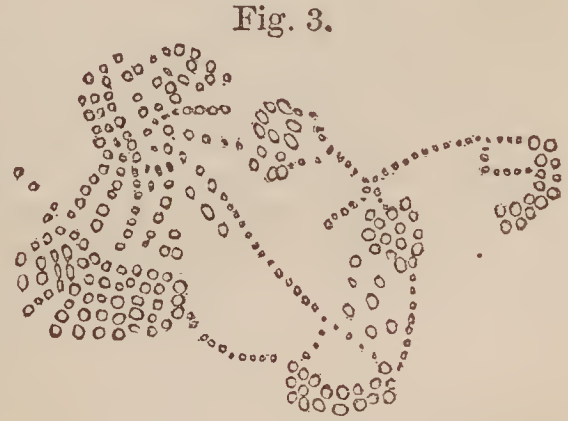


Vegetation in Aqua Calami.

a. Vegetation in Aqua Calami.—This (fig. 2) consists of a very mucilaginous pellicle, which, when viewed by the microscope, presents globules four times as large as those of yeast, and which are immersed in a mass of very small globules of mucus. The largest contain a finely granular matter, and are united in chaplets.

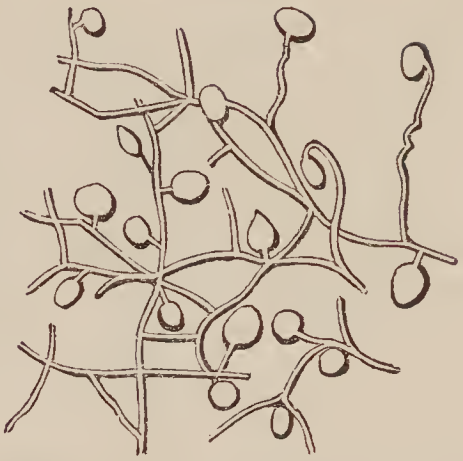
b. Vegetation in Aqua Valerianæ.—This (fig. 3) consists of irregular flocculi, which, by the aid of the microscope, are found to be made up of the union of a large number of globules, somewhat smaller than those of yeast. They are united in chaplets like the preceding, and the strings are arranged parallel to each other, many of them ramifying. They bear at their extremities globules, arranged in clusters.

Fig. 3.



Vegetations in Aqua Valerianæ.

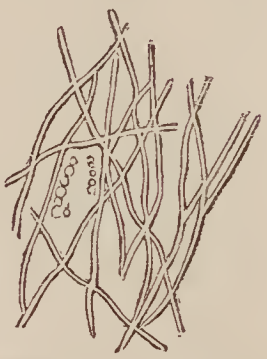
Fig. 4.



Vegetation in Aqua Rubi idæi.

c. Vegetation in Aqua Rubi idæi.—The vegetable produced in distilled raspberry-water (fig. 4) presents small broken flocculi, formed of unjointed branching filaments, furnished here and there with globular excrescences four times larger than yeast globules, and analogous to the organs of fructification of several algæ *(c. g. Vaucheria)*. (Kützing.)

Fig. 5.



Vegetation in Aqua Lauri Cerasi.

d. Vegetation in Aqua Lauri Cerasi.—That in distilled cherry-laurel-water (fig. 5) has the appearance of very fine and confused filaments, in which some very irregular articulations only can be perceived, the greater part presenting no trace of them. (Kützing.)

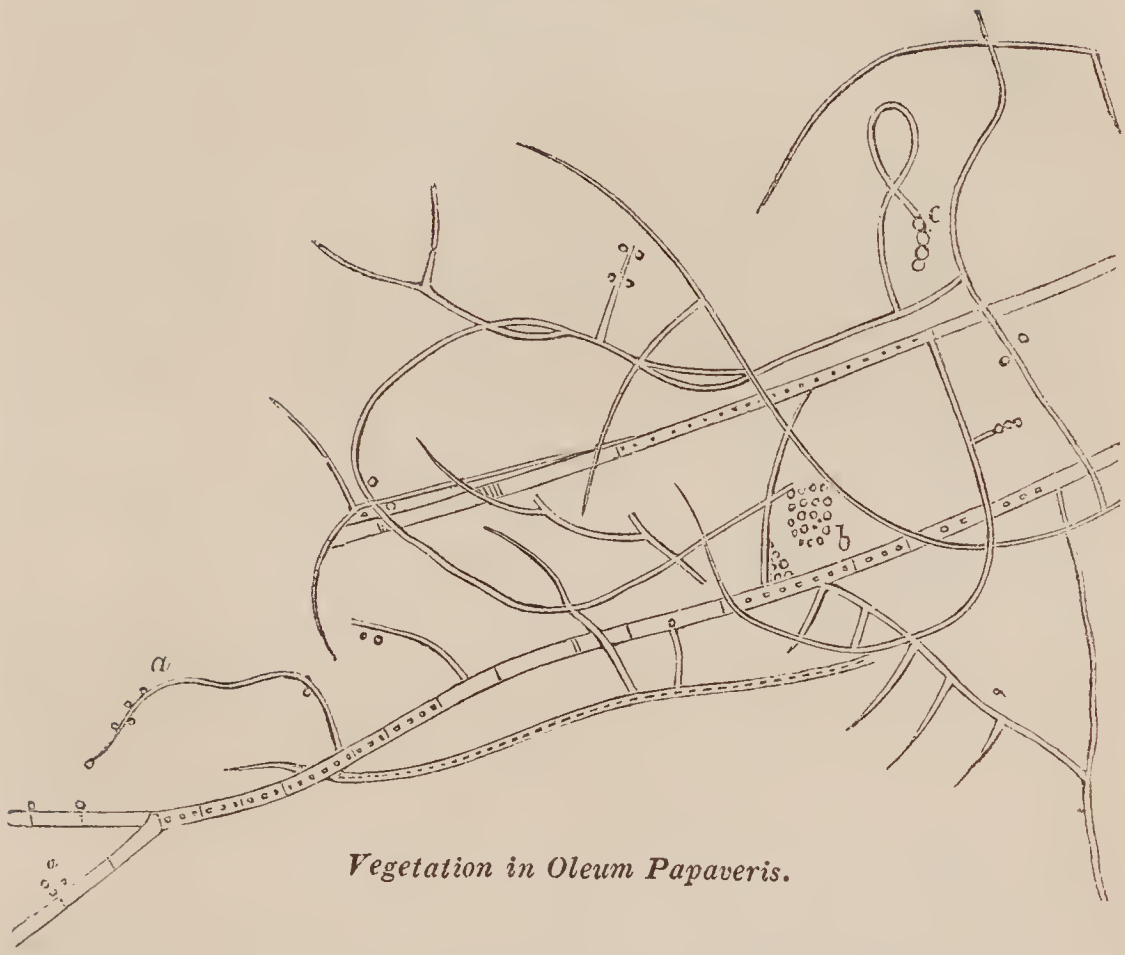
Fig. 6.

Vegetation in Aqua Salviæ.

e. Vegetation in Aqua Salviæ.—In sage-water, a very mucilaginous substance is met with (fig. 6) formed, as shown by the microscope, of branching filaments. Besides these, we perceive also some globules in clusters, as well as very small hyaline globules. We observe also large opaque excrescences: in every case the liquid becomes acid.

3. *Vegetation in the Fatty Oils.*—The fatty oils furnish also, when they have been kept a sufficient time, a mucilaginous substance, which is deposited at the bottom of the vessel, and at the same time they become rancid and acid. Kützing having examined the deposit formed in the oil of the poppy, found that it was composed of ramified filaments (fig. 7).

Fig. 7.



Vegetation in Oleum Papaveris.

The principal trunk was more strongly jointed than the branches. The branches are from three to six times longer than their diameter. The principal trunk is elongated at its extremity into a more slender unarticulated branch; these stems are suppliedwith transparent globular spores, some of which are isolated (*a*), and others collected in groups, and which are the rudiments of a new vegetable (*c*).

4. *Vegetation in a Solution of the Empyreumatic Succinate of Ammonia* (*Liquor Ammonii Succinici* Ph. Bor.) This solution also presents a flocculent mass (fig. 8) formed of filaments with numerous ramifications, which, from their principal trunk to their most delicate branches, appear to be articulated. The stems are six or eight times longer than their diameter, and contain small opaque globules which have, in the filament, the aspect of a small girdle.

Fig. 8.

Vegetation in Empyreumatic Succinate of Ammonia.

Fig. 9.

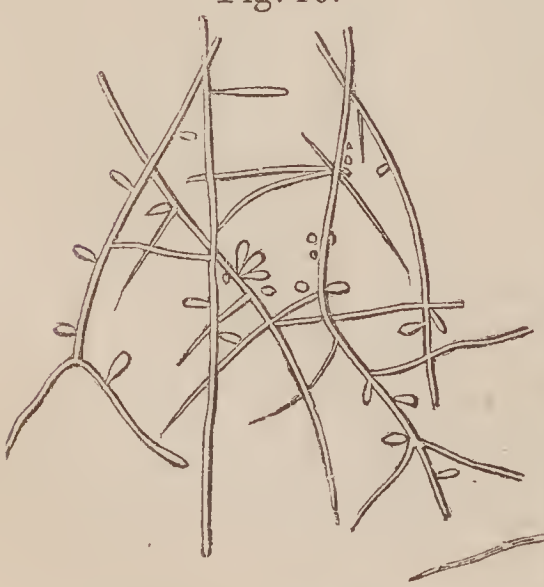
Vegetation in Rectified Spirit.

5. *Vegetation in Rectified Spirit.*—Kützing received from a Pharmacien some rectified alcohol in which some organic bodies had been formed analogous to the preceding. He observed that the nature of this liquid was scarcely capable of admitting a formation like that attributed to the wooden vessel in which the alcohol had been originally kept, and it is with some doubts as to its origin that he has described this vegetable (fig. 9). It is formed of very delicate filaments, whose ramifications are very often short. By a feeble light, there may be perceived an appearance of articulation which could not be real, but may be owing to globules contained in the interior of the filaments. *Camphorated Spirit*, prepared with the same alcohol, produced analogous vegetables.

6. *Vegetation in Phosphoric Acid.*—Kützing received from M. Beez some phosphoric acid, prepared by the oxidation of phosphorus by means of nitric acid, in which an organic formation (fig. 10) was developed. It resembled a species of *Sporotrichum* (Nat. Fam. *Fungi*, order *Hyphomycetes*, sub-order *Mucedines*). Its characters were as follows: filaments, not articulated, of uniform thickness; ramifications diverging, straight, and stiff; stems with globular or longish spores.

Phosphoric acid, prepared from bones, presented analogous appearances (fig. 11): filaments a little longer, much better articulated, three to four times longer than their breadth, and supplied here and there with some rounded spores.

Fig. 10.



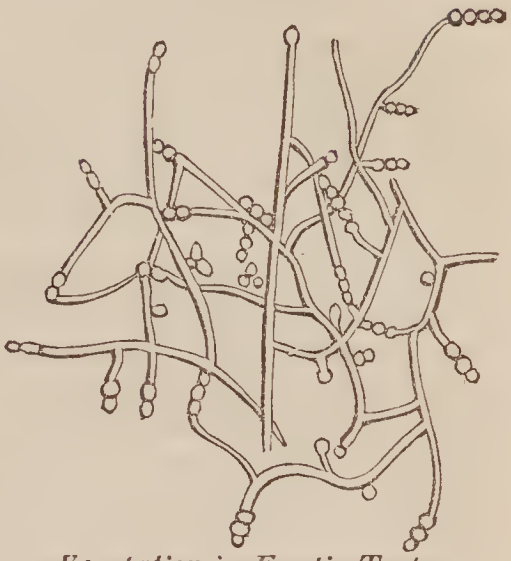
Vegetation in Phosphoric Acid from Phosphorus.

Fig. 11.

Vegetation in Phosphoric Acid from Bones.

7. *Vegetation in Tartarized Antimony.*—The solution of emetic tartar also presented a flexible mucilaginous mass (fig. 12), composed of stems which at first are not articulated, but whose extremities divide and form branches in chaplets. At the same time oxide of antimony was separated in the solution. This plant closely agrees with the genus *Oidium* (Nat. family *Fungi*).—(Kützing.) I have examined the vegetations in several solutions of emetic tartar, and find that they agree with the one figured by Kützing, with the exception that in most of the stems and branches small globular bodies were contained, the larger of which appeared to be nucleated. I have also found similar vegetations in solutions of *tartaric acid* and *bitartrate of potash*. In the solution of the bitartrate I also observed globular or ovoid nucleated bodies, resembling the yeast plant.

Fig. 12.



Vegetation in Emetic Tartar.

(*To be continued.*)

MR. SCANLAN'S CHLORINE FUMIGATOR.

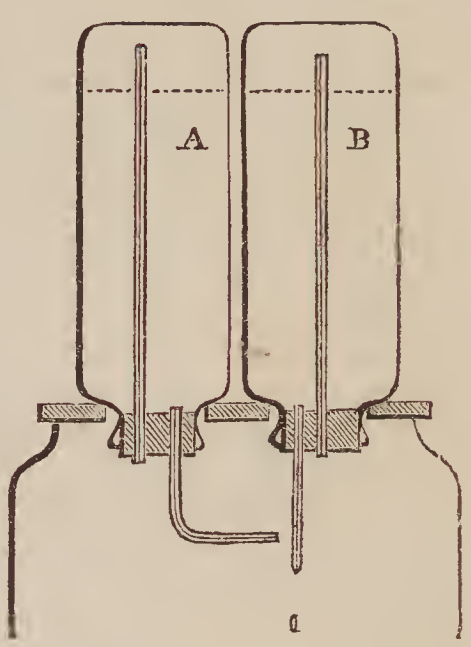
When Asiatic cholera raged in Dublin a few years ago, I contrived an easy method of extricating chlorine gradually, for the purposes of disinfection, which was adopted in most of the hospitals there at the time, and met with general approval amongst the medical men, from its great simplicity and cheapness. A bottle of solution of chloride of lime was furnished, of the usual strength, then, as well as now, to be met with in every Chemist's shop. This bottle was accompanied by an acid dropping bottle, containing a quantity of diluted muriatic acid, of such strength as to decompose exactly the chloride of lime furnished along with it. The bottle of acid being fitted with a perforated cork, through which a piece of thermometer tube, about two inches long, was passed, a notch being also cut on one side the entire length of the cork for the admission of air when the bottle was placed in an inverted position for use.

The contents of the bottle of chloride of lime were poured at once into a shallow basin, and the acid-dropping bottle inverted over it, and supported in that position; the acid dropped gradually into the chloride, and thus a slow and continuous evolution of chlorine was obtained.

As a very perfect mixture of the two fluids is not obtained in this arrangement, occasional stirring must be had recourse to. This requires some attention; and besides, the chlorine is consequently not eliminated with such perfect continuous regularity as we could wish. I therefore now propose the employment of twin dropping bottles, the one to contain the chloride, the other the acid. In this way a compound drop may be procured, from which chlorine will be evolved in its passage through the air, if it be suffered to fall from a height into a flat-bottomed stone-ware pan placed beneath to receive it, where it will gradually part with the remainder of the gas. Any number of these may be disposed in different parts of a ward, in proportion to its size.

It will strike every Chemist that the dropping-tube of the chloride of lime would quickly become obstructed by the formation of carbonate of lime on its exterior; but in order to prevent this, I bend the acid dropping-tube at

a right angle, and place the two bottles in a juxta-position, so that the acid shall drip over the chloride dropping-tube, and thus prevent such an occurrence. The annexed sketch will show more clearly, perhaps, than the above description, what I propose.



A is the acid, and *B* the chloride dropping-bottle. Here tubes are introduced for the admission of air, as the corks with notches for this purpose are not easily managed by the million.

It is obvious that fixed dropping-funnels might in some situations be preferable to these *portable* twin bottles; and a supply of the two fluids might be poured from time to time into such fixed dropping-funnels. There would be this objection, however, to the use of open funnels — that carbonate of lime would be formed in the chloride, which might obstruct the tube from within.

I may observe, I have found that a *thermometer* tube affords a sufficiently rapid drop for the purpose required.

Health of Towns' Magazine.

Chemical Works, 25, *Great George Street, Bermondsey.*

CHLOROFORM.

In an article on the above subject in the last number of this Journal, we stated that strict attention should be paid to the quality and composition of this anæsthetic agent, the use of which appears to be increasing. The demand for it has indeed been so extensive, that those originally engaged in its manufacture were unable to produce it fast enough, so that a great number of new makers have sprung up, and the price, as was anticipated, has considerably gone down. The competition which at present exists, will, no doubt, produce a beneficial effect in some respects, but it renders it more than ever necessary for Druggists to ascertain that the article they are selling as chloroform is such as it ought to be.

No better process for making it has yet been proposed than that of Dumas (see page 278 of the last number) which, we believe, is generally adopted. This process, however, is not free from danger, and ought not to be attempted without particular precautions. We have heard of several narrow escapes from serious accidents. On applying heat to the mixture of chloride of lime, spirit, and water, a violent action ensues, accompanied by a great frothing of the ingredients, so that if the still or distillatory vessel be not capable of holding eight or ten times as much as the quantity of ingredients introduced, the still-head may be blown off with considerable violence, and the apartment filled with chlorine vapours. Immediately after this action has taken place, a dense oily-looking liquid passes into the receiver, where it sinks to the bottom of the water, which distils over with it.

Perfectly good chloride of lime should be used, otherwise the product will be very small.

The dense liquid thus obtained is impure chloroform. It is necessary to purify this by treating it with oil of vitriol, and carbonate of baryta or of potash, and by subsequently distilling it from chloride of calcium after washing it repeatedly with water. The product will now

be pure, if sufficient time and pains have been devoted to the latter part of the process.

Not unfrequently, however, it will be found still to retain a minute portion of alcohol (?), the presence of which is considered by some persons to be prejudicial. M. Mialhe in a communication recently made to the Academy of Sciences of Paris, states as the result of his researches:—

"1. That pure chloroform, applied to the skin or mucous membrane, produces simple redness, without cauterization or vesication. It acquires, however, caustic properties when mixed with a small quantity of absolute alcohol.

2. That the chloroform used in medical practice, which has caused vesication of the lips or nostril, with irritation of the bronchial tubes, could not have been pure.

3. That this chloroform contains a certain quantity of anhydrous alcohol. The presence of this liquid in chloroform was suspected by MM. Soubeiran and Gerdy, and it has been demonstrated by analysis. The alcohol may act by combining with and coagulating the albuminous fluids of the body, and thus giving rise to the local effects of irritation.

Hence, before using chloroform vapour in surgical practice, it is indispensably necessary to ascertain whether it be pure. M. Mialhe finds that the following is a very delicate test of the presence of alcohol in chloroform: —Place some distilled water in a tube or glass, and drop on it a small quantity of chloroform. The greater part sinks immediately to the bottom of the vessel, owing to its great density (sp. gr. 1.48). A small quantity floats by repulsion, but may be made to fall in small globules by agitation. If the chloroform be pure, it remains transparent at the bottom of the vessel; but if it contain only a small portion of alcohol, the globules acquire a milky opacity."

Assuming the whole of the facts to be as stated by M. Mialhe, this test would appear to be a very delicate one, for we have found that some specimens of chloroform which remained transparent when added to water, acquired a perceptible opalescence if treated in the same way after the addition of one-thousandth part of absolute alcohol, and the effect became marked when the alcohol amounted to one three-hundredth. If rectified spirit be added in small quantity to transparent chloroform, the mixture becomes at once opalescent, although a larger quantity of spirit forms a clear solution; so that when transparent chloroform contains minute quantities of alcohol, it seems probable that the latter is in the anhydrous or nearly anhydrous condition, as stated by Mialhe, and that the milkiness which takes place, on the addition of water, is the consequence of the hydration of the alcohol. This milkiness generally disappears with a slight increase of temperature, the momentary application of a warm hand to the tube containing the mixture being sufficient to render it transparent. It may be inferred from this, that the test which appears to be so delicate at a low temperature, would not be equally, if at all, delicate in warm weather.

When chloroform has become milky from contact with water, it immediately reacquires its transparency on shaking it with a little fused chloride of calcium. This effect is not so readily produced by contact with oil of vitriol; on the contrary, chloroform, previously transparent, becomes opalescent when oil of vitriol is added to it. If the opalescence be ascribed to hydration, the water must, in this case, be taken from the oil of vitriol, which is not probable.

It is difficult to account for the effect ascribed to the presence of

minute quantities of alcohol, and, indeed, the subject requires further investigation.

Pyroxylic spirit may be substituted for spirit of wine in making chloroform, and under these circumstances the process, in the first stage of it, is more manageable and less subject to accidents than when alcohol is used. The reaction which takes place on the application of heat is less violent, and is not accompanied by so much frothing and disengagement of gas. Unfortunately, however, the product thus obtained is unfit for medicinal use, as it retains a disagreeable flavour, acquired, probably, from impurities which are always present in pyroxylic spirit.

Some specimens of chloroform which have been offered for sale at a very low price, have evidently been made from pyroxylic spirit, the taste and smell indicating their origin.

M. Mialhe, in the communication already alluded to, mentions the following among the chemical properties of chloroform :—

"It rapidly evaporates, producing great cold when dropped on the skin. It has neither an acid nor alkaline reaction, but is perfectly neutral when pure. It is easily dissolved by alcohol and ether, but is again separable by water. It readily deoxidizes nitric acid by the aid of a moderate heat : gold is not dissolved by this mixture, hence no hydrochloric acid is formed, and no chlorine is evolved. Chloroform does not dissolve gold, nor does it bleach vegetable colours ; hence it contains no free chlorine. Potassium floats in it without decomposing it, and no gas is evolved. (If much alcohol or ether were present, there would be an evolution of hydrogen.) It forms a milky liquid, but does not enter into combination with caustic potash. It gives an oily-looking stain to paper, easily dissipated by heat ; the vapour is not inflammable, but it renders the flame of a wax-candle smoky and carbonaceous, like chlorine. What is commonly sold as chloric ether is a solution of chloroform in alcohol. The alcohol may be detected and separated by water, as in the washing of ether ; it may be also detected by potassium ; and as chloroform boils at 140°, and alcohol at 172°, it is probable that Dr. Ure's method of detecting pyroxylic spirit in alcohol, by the temperature of ebullition, might be applied to the detection of alcohol in chloroform."

In reference to the administration of the vapour of chloroform, we quote from the *Lancet* the following statements recently made by Dr. Snow, which involve some points worthy of notice.

"Dr. Snow made some remarks respecting chloroform, at a recent meeting of the Westminster Medical Society. He said that this agent, which had been introduced by Dr. Simpson, to be inhaled instead of ether, was preferable to the latter in some respects, although it was impossible that any thing could be more efficient than ether, as it was capable of totally preventing the pain in every operation in which it might be properly applied. He considered that the action of chloroform on the nervous system was identical with that of ether. By regulating the proportion of vapour in the air, he had produced the same effects on animals by both agents ; chloroform, however, had the advantage of being less pungent, and, therefore, less care was required in graduating its first admission to the lungs; it was readily inhaled, and produced its effects with great rapidity, and the quantity of it consumed was curiously small when compared with ether. He had administered it on Thursday, in an amputation of the breast performed by Mr. Tatum, at St. George's Hospital. He gave it with his usual apparatus, the water-bath being 55°, and the quantity of vapour in the air inhaled not more than ten per cent. by measure, yet the patient was ready for the opera-

tion to begin in less than a minute, and it was performed without the least sign of pain, being equal to the best cases of etherization. The patient recovered her consciousness, as might have been expected from narcotism by ether to the same degree, and she was going on well. Only one fluid drachm of the material was used, although about ten fluid drachms of ether would probably have been used in the same operation. He (Dr. Snow) had inhaled it until he became unconscious, and was very sick afterwards, as on the only occasion on which he inhaled ether to the same extent. When the full effects of ether could be induced quickly, there was no preliminary excitement, and as the new agent produced its effects very speedily, excitement previous to insensibility could probably be altogether avoided in its use. The chloroform placed on the table had been given to him by Mr. Bullock, the chemist; it had been rectified from chloride of calcium; he (Dr. Snow) found its boiling point to be 140°; he was not aware that the elastic force of its vapour, at other temperatures, had been ascertained; but, from some experiments that he had made, it seemed to follow a ratio very similar to those for ether-vapour and vapour of water; he had ascertained the quantity of vapour of chloroform that air would hold in solution, at various temperatures, and it was shown in a table, of which the following is a copy:—

Quantity that 100 *cubic inches of air will take up.*

Temp.	Cubic inches.
50°	9
55°	11
60°	14
65°	19
70°	24
75°	29
80°	36
85°	44
90°	55

The quantity of this vapour in the air the patient inhaled, at ordinary temperatures, was only about a quarter as much by measure as there would be of ether,—being, however, nearly twice as heavy; there was nearly half as much by weight. Now, on account of the small space it occupied, it only excluded the air to a quarter the amount that ether-vapour did, and therefore interfered but little with the natural process of respiration; the patient, indeed, could take in nearly the usual amount of oxygen without quickening or enlarging the respiratory movements. It was to be observed that temperature exerted a great influence over the quantity of this vapour that air would take up, and thus an elevation of little more than fifteen degrees in the warmth of the apartment, would double the amount of it which the patient would inhale in a given time, if no means were taken to regulate the evaporation. Dr. Simpson recommended the chloroform to be inhaled from a sponge or handkerchief, and this simple means was efficient; but he (Dr. Snow) preferred to use an apparatus, as, without it, more of the vapour was blown away by the warm breath of the patient than was inhaled. The strength of the vapour could not be regulated; it could not even be known when it was all expended, and no exact observations could be collected. The chloroform was of easier application than ether, on account of its quicker action; but, for the same reason, greater care was required in its use, to avoid accident."

In conclusion, it may be well to repeat, what has already been stated, that chloroform differs from the liquids sold under the names of *chloric ether*, and *terchloride of carbon*, inasmuch as these last-named substances are solutions of chloroform in spirits of wine, and the processes originally given for the preparation of these would be inapplicable for the preparation of chloroform.

Chloric ether and *terchloride of carbon* are subject to much greater variations in quality and composition than chloroform is. There are no recognised standards by which the strength of these compounds may be estimated. Some specimens contain only five or six per cent. of chloroform, while others contain fifteen or eighteen per cent. The latter may be considered the composition of good chloric ether, and this quantity ought to separate from the spirit, forming a dense stratum at the bottom, when the chloric ether is mixed with twice its volume of water. The separation should be effected in a graduated tube, and the mixture well shaken together to ensure the complete removal of the spirit by the water, the mouth of the tube being at the same time closed with a cork, to prevent evaporation of the chloroform.

Chloric ether has been used for many years, and is strongly recommended by some medical men as a valuable diffusible stimulant when administered in doses of half a drachm or a drachm. It is worthy of trial as a remedy for cholera. As the chloroform, the active constituent of this so-called ether, is separated and rendered insoluble on admixture with water or aqueous liquors, it seems desirable to point out a convenient form for its administration. Cases have occurred in which a patient has been intoxicated by the last dose of a mixture containing chloric ether, the chloroform having separated and collected at the bottom of the bottle, and having been consequently administered almost exclusively in this dose.

Mr. Morson, who has had much experience in the preparation and administration of chloric ether, recommends the following as the best method of administering it:—

℞ Chloric ether, ʒvj.
Syrup, ʒss.
The yolk of an egg.
Distilled water, ʒivss.

Rub the yolk of egg with the syrup, then add the chloric ether and the water, mixing them together to form an emulsion.

The chloroform is held in suspension in this mixture, so that the evil above alluded to would be obviated. R.

ON THE PROPERTIES OF BROMIDE AND CHLORIDE OF OLEFIANT GAS OF BROMOFORM, CHLOROFORM, & IODOFORM.

BY R. M. GLOVER, M.D. *

The only experiment on an animal with any of this class of bodies is one related by Dr. Cogswell with iodoform, which he terms sesquiodide of carbon, but which we now know to be a compound of three atoms of iodine with one of formyl. The curious results of this experiment led me to investigate this class of bodies which, from the results of my experiments, appear to form a new class of poisons, and to be possessed of properties not unlikely to be beneficial in the treatment of disease.

The composition of these bodies, taking the compounds of chlorine as examples, is C_4 H_3 Chl.+H Chl. for the chloride of olefiant gas; and C_2 H Chl_3 for chloroform.

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* From Dr. Glover's *Harveian Prize Essay*, for 1842. *Ed. Med. and Surg. Journ.* No. 152.

In the investigation of the properties of these bodies, I shall first show the striking resemblance in leading characters among the members of the group, and then take chloroform as an example of some of their more minute properties.

(The author gives an account of a variety of experiments, the details of which are interesting in a medical point of view, but not suitable for this journal.)

Remarks. Great resemblance exists among the properties of this class of bodies, which appear to form a new order of poisonous substances, uniting in themselves physiological properties which are not found united in any other known class of poisons. The distinguishing characteristics are, first, the remarkable power they possess of obstructing the pulmonic circulation, whether they are injected into the veins or introduced into the stomach ; then the action on the spinal cord and afterwards on the brain ; and lastly, the corrosive and irritant action exercised on the stomach. In the case where chloroform was injected into the carotid, death appears to have been produced by the loss of nervous action consequent on the direct action of the poison on the brain. This effect might be accounted for by the obstruction to the flow of blood through the capillaries of this organ thus induced. The mechanical properties of this class of bodies may peculiarly fit them for obstructing the circulation through the lungs. It was shown, for instance, that when injected into the jugular, their smell is almost instantly perceptible in the expired air, so that the vapour getting into the air-cells may place the blood much in contact with the substance. The action on the spinal cord is very different from that of strychnia, to which my friend Dr. Cogswell compared it in the case of iodoform. Strychnia destroys the influence of the will over the muscles, but appears to excite the spinal cord, which loses its sensibility under the action of this class of poisons. The blackening of the mucous membrane of the stomach which these substances produce is another curious property. This effect appears to be compounded of the corrosive and irritant action of the poison, its effects on the colouring matter of the blood, and that congestion of dark blood found in the stomach in certain cases of coma.

Where the poison was introduced directly into the circulation, we had the heart's action put a stop to, and its irritability destroyed, where the dose was large. In other cases a smaller dose caused obstruction to the flow of blood through the lungs, while the heart's action continued ; and in one case this obstruction was shown by the hæmadynamometer. In that case the pressure in the arterial system was diminished, but the heart's action continued.

The difference between the action of iodoform and that of the other members of the group, is, that this body produces the peculiar effects more slowly, owing, doubtless, to its solid form.*

The whole group have a surprising power of penetrating the tissues. Dr. Cogswell found iodine where iodoform was given into the stomach, after death, in the blood, brain, and muscles ; and I have observed the most distinct smell of the substances to a similar extent.

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* I have used iodoform with great benefit externally in many obstinate skin affections, such as *lepra*, *psoriasis*, chronic eczema ; and internally with benefit in a very old case of bronchocele, and in scrofulous enlargements of the glands. I gave it in doses of two grains thrice a day in pill, with mucilage and bread-crumb ; externally, in the form of an ointment of half a drachm to the ounce of simple cerate. I believe that this may prove one of the most valuable remedies that we have.

ACETIC EXTRACT OF COLCHICUM.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—On reading Mr. Fordred's paper in this month's Journal, on the preparation of the Acetic Extract of Colchicum, I was surprised to find that no remarks were made upon it when it was read. It seems to have escaped Mr. Fordred's observation, that the Pharmacopœia does not direct the starch of the colchicum cormus to form part of the preparation in question. The words are "exprime *succum*, eumque, &c.," and I cannot conclude from them that the starch, or any other insoluble matter which may pass through the strainer, is to be included in the term *juice*, or is intended to form part of the extract.

The Pharmacopœial preparation was no doubt suggested by that of Sir C. Scudamore, and although a different method is adopted from that proposed by him, the result would be about the same, provided the starch were excluded, and I would urge this, if any argument were required, to show the intention of the authors of the Pharmacopœia. I may observe, that the juice being rendered more limpid by the precipitation of the albumen by the acid, renders the separation of the starch particularly easy.

If my reading of the Pharmacopœia be the correct one, it is important that the improved mode of manufacture should be an *erratum* in the next number of the Journal, so that it may not be generally adopted in future. I am, Sir, your obedient Servant,

Henry Taylor.

10, *Pall Mall*, 15*th December*, 1847.

[The instructions of the Pharmacopœia on the point in question are not sufficiently explicit to enable us to give a positive opinion.—Ed.]

ON THE MANUFACTURE OF GAS.

BY ANDREW URE, M.D., F.R.S.

To the Editor of the Pharmaceutical Journal.

The observations made in your last number, under the head of "Improvements in the Manufacture of Gas," though correct in general, require certain modifications. The great fall in the price of the London gas cannot fairly be ascribed to any considerable recent improvements in the quality or quantity of gas produced from a ton of coals; but is almost entirely due to the economy of the fuel used in decomposing the coal. At one period, not only the whole coke of the decomposed coal in the retorts was expended in fuel, but also a good deal of fresh coal. By successive improvements, however, in mounting and managing the retorts, our gas companies have finally succeeded in effecting the production of their gas, by the expenditure of from one-third to one-fourth of the coke; thus reserving for sale from two-thirds to three-fourths of the whole. The main source of profit to the companies at present proceeds, therefore, from the sale of their coke, so that they may, with as much propriety, be styled manufacturers of coke, as of gas.

You have properly animadverted on the little novelty in Mr. Palmer's patent, too little indeed to resist an action at law: but it is surprising that a person who has been so long tampering with gas as Mr. Palmer, should be apparently ignorant of the first principles on which the illuminating power of carburetted hydrogen depends. This subject was fully investigated by the illustrious French chemist, Berthollet, more than forty years ago.

The good gaseous products of the decomposition of coal in retorts are chiefly two, viz. carburetted hydrogen (of the same composition as coal-mine gas) and bi-carburetted hydrogen, called also olefiant gas. The latter contains twice as much carbon as the former, to which it owes its rich illuminating power. Well made coal gas, from good Newcastle coal, contains, in its crude state, from ten to eighteen per cent. of this superior gas; though a good deal of it is abstracted and lost in some gas-works by injudicious washing; for olefiant gas is soluble pretty largely in water.

Berthollet demonstrated, that if pure olefiant gas be transmitted through an ignited tube, it is partially decomposed with deposition of charcoal, and becomes a sub-carburetted hydrogen gas. In this way a bright burning gas may be so much impoverished of carbon, as to afford only a blue flame. Nothing, therefore, can be imagined more preposterous than Mr. Palmer's project of improving his manufacture of gas by transmitting it through ignited tubes. The scheme has been repeatedly attempted by unscientific speculators in various forms, but has been sooner or later abandoned, after occasioning no little injury to the establishment.

Mr. Palmer's other project, of using cannel coal, is quite impracticable in London; first, from the high price of cannel coal here, and next, from the worthlessness of its coke. The thing has been tried, but was, for these reasons, soon given up. His proposed plan for abstracting sulphur is of a very problematic nature, and may be regarded as at least superfluous, for all the leading gas companies of the metropolis furnish gas well desulphuretted. In fact, Mr. Palmer's patent is merely a collection of the shreds and patches of worn-out projects—a motley group of make-shifts, under the cover of our anti-scientific legislation, which in no other but our own jobbing law-laden country would be taken under patent protection.

Bloomsbury Square, December 16, 1847.

GYMNEMA SYLVESTRE,

An Indian plant, which, when chewed, destroys the power of tasting Sugar.

At a meeting of the Linnæan Society, on Tuesday, December 7th, Dr. Falconer made a communication which he had received from Captain Edgeworth, who was located in the northern part of India. Captain Edgeworth, an acute observer, and one who is actively engaged in prosecuting the study of botany, hearing from the natives that a plant grew in that neighbourhood, which, if chewed, would destroy the power of the tongue to appreciate the taste of sugar, and all saccharine substances, at first thought this an extremely problematical and fanciful statement; but knowing the natives of India to be re-

markable for their powers of observation, there being scarcely a plant in the country to which they did not attribute some property, fanciful, but more generally real, he was determined to try the effect of the plant in question. The name of the plant is *Gymnema sylvestre*; nat. ord. *Asclepiadeæ*, a native of the plains in the north of India. It has a greenish flower and thick fleshy leaves, and like most of the plants of this order, it produces a milky juice. Captain Edgeworth chewed some of the leaves, and was surprised at not perceiving the acrid taste of the plants of this order; but about two hours afterwards, when taking some tea, he was greatly surprised to find that although he could fully appreciate the aroma of the tea, he was perfectly unable to appreciate the taste of the sugar. Thinking this to be a very strange circumstance, he obtained some preserves and other substances containing sugar, and upon putting them upon the tongue, he found he was still quite unable to appreciate the saccharine quality; he then obtained some powdered sugar, and it appeared only like so much sand in his mouth. This effect lasted altogether nearly twenty-four hours, when he recovered the power of tasting sugar. To avoid all chance of error, Mrs. Edgeworth afterwards tried the effect of the plant, and with precisely the same result. Dr. Falconer considered this effect to be an extremely curious one, and he believed that it was the only well authenticated case upon record of such an effect being produced upon the organ of taste, that although it was well known that many substances have the power of preventing the eye distinguishing certain colours, but none that had the power of destroying the sense of taste for any one particular substance, while it could appreciate others, and might, consequently, lead to some important physiological discovery as regards the organ of taste.

ON THE EFFECT OF COFFEE IN DIMINISHING THE BITTER TASTE OF SULPHATE OF QUININE.

BY M. QUEVENNE.

Sulphate of quinine is less soluble in an infusion of coffee than in water: this is evidently the cause to which the property possessed by the former liquid, of masking the bitterness of the quinine, must be referred. Besides this the part remaining undissolved at the bottom of the vessel absorbs certain elements of the coffee (amongst others tannin and colouring matter), and becomes still less soluble, not only in an infusion of coffee, but also in pure water. With respect to the practical inferences to be drawn from these observations in a Pharmaceutical point of view, it may be remarked that, besides the necessity already pointed out by M. Dorvault (*Répertoire de Pharmacie*, t. 3, Juin, 1847), of not dissolving the salt of quinine previously in acidulated water, but of putting it in powder in the infusion of coffee, and taking it whilst in a state of suspension, it is better that the coffee should not be very warm when the sulphate of quinine is added, the solvent power of the liquid, and, consequently, the development of the bitter taste, increasing with the temperature. The coffee should not be employed too strong, as that would increase the tendency to the formation of tannate of quinine—a salt less soluble, and, consequently, less active than the sulphate. Nine grains of sulphate of quinine, added to an infusion of two and-a-half drachms of coffee, in three ounces of water, with sugar *ad libitum*, are suitable proportions.

As regards the effect produced on the activity of the sulphate of quinine,

when thus mixed with coffee, these observations would naturally lead us to inquire how far this diminution of solubility could injure the effect of the medicine. It is evident that, starting with this general principle, uncontrovertible both in physiology and chemistry, that the activity of bodies is increased in proportion as they are dissolved, or readily acted on by the liquids with which they come in contact; and remarking, on the other hand, what has been proved by actual experiment, that sulphate of quinine, dissolved in acidulated water, acts more promptly and energetically than when in a state of partial solution in pure water, or in pills, we must arrive at the conclusion that the manner of administration, of which we are now treating, is disadvantageous. But, at the same time, sulphate of quinine, being a medicine almost invariably very decided in its action, we believe, that, in the majority of cases, notwithstanding the disadvantages resulting from its diminished solubility, this discovery will prove useful to invalids, by enabling them to take what to some is a disagreeable medicine, without perceiving the taste. Still, it is right that the physician should be acquainted with these disadvantages, that in obstinate cases he might either increase a little the dose, or rather have recourse to a more favourable mode of administration, namely, solution of acidulated water.—*Journal de Pharmacie.*

ON THE PREPARATION OF INFUSIONS AND DECOCTIONS IN PRUSSIA.

The sixth edition of the Prussian Pharmacopœia, directs all extracts and volatile oils, and most of the ointments and plaisters, to be prepared by means of a steam apparatus or water-bath.

With regard to this the Prussian Government has recently issued the following regulations:

As the object of the above directions is to obtain more uniform and effective infusions and decoctions, Apothecaries are required to provide themselves with the necessary steam apparatus, and to proceed in the preparation of decoctions, decocto-infusions, and infusions, in the following manner:

The tin or porcelain vessels for decoctions must be so constructed that at least three-fourths of their height may be exposed to steam, which must possess the temperature of boiling water. Part of the vessel may be in direct contact with the boiling water. If the steam be generated in a boiler, its temperature must never be so high as to heat the liquid contained in the vessel to a boiling temperature. The vessels must be furnished with lids of the same material and fitting close.

The same quantity of the substance as prescribed by the Physician, broken or cut into small pieces, is stirred in the decoction vessel with as much cold water as is known by experience to be required for obtaining the prescribed quantity of liquid, and the vessel being well closed, is to be exposed for half-an-hour to the influence of steam, during which time the vessel is to be well shaken several times and the contents immediately filtered whilst hot. If some other substance is to be added towards the end of the operation, this must be done after the vessel has been exposed to the steam for twenty-five minutes.

Decocto-infusions are prepared by adding to the hot contents of the vessels, the substance to be infused after the decoction has been exposed to the steam for the prescribed time, stirring carefully, closing the vessel, and allowing it to become perfectly cold, after which the contents are to be filtered.

The infusions are prepared in the usual way: boiling water is poured over the well-broken or cut substance, the contents of the vessel stirred up,

the latter closed, the liquid allowed to become perfectly cold, and then filtered.

If the Apothecary wishes to employ for the infusions, water which has been heated in a kettle to a boiling temperature by the steam of the apparatus, the vessel must be exposed to the steam for five minutes.

If the quantity of the medicine, and that of the liquid to be obtained from it, are not prescribed by the physician (which ought only to occur in extraordinary cases) one drachm of the substance is taken for every ounce of the decoction or infusion. In order to obtain a *concentrated decoction*, the vessel is to be left for three-quarters of an hour to the influence of the steam; and for a *very concentrated decoction*, one hour, without increasing the quantity of the medicine. *A concentrated infusion* is prepared by increasing the substance to be infused by one-half of the prescribed quantity, and *a very concentrated infusion* by doubling it.—*Buchner's Repertorium.*

ON OLEUM RICINI ALCOHOLICUM.

M. August Ostermayer, a merchant in Munich, has received from Trieste, and offers for sale a sort of oleum ricini alcoholicum, which is much patronized in Italy. From half-an-ounce to one ounce, according to the age and constitution of the patient, is prescribed with half-an-ounce of *aqua naphæ*, and half-an-ounce of *syrup. cort. aurant.* This oil is said to be less disagreeable to the taste in this form and mixture, and also to operate more effectively than the common ol. ricini obtained by pressure, or boiling with water.

Dr. Buchner gives the following description of it :—the ol. ricini alcohol. is of a very pale yellow oil colour, and somewhat turbid. When left standing, white flakes and some small globules form in it, and which appear to arise from the presence of water. The specific weight is only 0.920, that of common castor oil, according to Brandes, Schübler, and others, being 0.954 to 0.970. It is clear and somewhat thick. The ol. ric. alcohol. possesses a faint smell of alcohol, altogether void of fuselol [oil of grain] ; and a not disagreeable oily and alcoholic taste. If taken without syrup and *aqua cort. aurant.* it leaves behind in the throat a slight, rather persistent acrid sensation. The alcohol which it contains is not very strong, but it can easily be ignited, and it then burns with a blueish flame, leaving some particles of water mixed with the oil. To determine the proportion of castor oil, six drachms, or 360 grains of *ol. ricin. alcohol.* were submitted to a temperature of from 167° F. to 212° F., in a porcelain capsule for 48 hours. The residual oil weighed 259 grains, and possessed the same colour and consistency as genuine ol. ricini, only after being swallowed it left the above-mentioned acrid sensation in the throat. The result of this experiment is, that the ol. ricini alcohol. contains 72 per cent. of common castor oil, including the drastic part of the latter, and 28 per cent. of alcohol and water.

M. Buchner, who supposes this oil to be an alcoholic extract from castor seeds, made the following experiment : 142 grains of perfectly ripe seeds were carefully peeled, and yielded 98 grains, or 69.01 per cent. of kernels, and 44 grains, or 30.99 per cent. peels. The first were triturated into a paste, and digested with about two drachms of spirit of wine of 90 per cent. at a gentle heat. The oleo-alcoholic extract being removed from the sediment, was much like the ol. ricini alcohol., but paler, and at the same time of a stronger alcoholic taste, which shows that the Italian oil is prepared with weaker spirit. It was accompanied by the same acrid sensation as the Italian oil. The residue was afterwards distilled twice with larger quantities of alcohol of the same strength, and at last with ether. The exhausted bran dried at 212° Fahr., formed a yellowish white powder,

having a mealy taste, and weighed 33.5 grains; the employed seeds, weighed with their shells, yielded accordingly 35.5 per cent. oil, 33.5 per cent. bran, and 31.0 per cent. shells.

Geiger says, he found in castor seeds, besides 46.19 per cent. oil (which also possessed an acrid taste) fecula (amylon ?) together with gum and albumen. Buchner, however, convinced himself that the residue freed from oil, consists for the greater part, of emulsin, is not coloured blue by iodine, and contains, therefore, no starch, but sugar; for a very diluted *emulsio ricini* when mixed with washed yeast, undergoes the alcoholic fermentation at a low temperature.—*Buchner's Repertorium.*

THE BRAZIL-NUT TREE.

The one of all these most attractive was that which produces the Brazil-nut, called in the country *castanhas*. Botanically it is the *Bertholletia excelsa*. This tree was upwards of 100 feet in height, and between two and three in diameter. From the branches were depending the fruits, large as cocoa-nuts. The shell of these is nearly half an inch in thickness, and contains the triangular nuts, so nicely packed, that once removed no skill can replace them. It is no easy matter to break this tough covering, requiring some instrument and the exercise of considerable strength; yet we were assured by an intelligent friend at the Barra of the Rio Negro that the *Guaribas*, or howling monkeys, are in the habit of breaking them by striking them upon stones or the limbs of iron-like trees. This friend related an amusing incident of which he had been witness, where the monkey, forgetful of every thing else, pounding down the nut with might and main, in a fever of excitement, struck it with tremendous force upon the tip of his tail. Down dropped the nut and away flew monkey, bounding and howling fearfully. How long the victim was laid up by his lame tail our friend was unable to inform us; but we thought one thing certain, that monkeys had changed since Goldsmith's day, inasmuch as at that time, as we are informed, the tip of a monkey's tail was so remote from the centre of circulation as to be destitute of feeling. When the castanha-nuts are fresh they much resemble in taste the cocoa-nut, and the white milk, easily expressed, is no bad substitute for milk in coffee. This soon becomes rancid, and at length turns to oil. The nuts are exported largely from Pará, and are said to form a very important ingredient in the manufacture of sperm candles.—*Voyage up the Amazon.*

THE BENEVOLENT FUND.

In the Bye-laws relating to the distribution of the Benevolent Fund, published in our number for November, an *Erratum* occurred.

"Every person who shall, at any one time, have given to the said Benevolent Fund the sum of £5, shall have twenty votes, and the like number of votes for any similar sum of £5 given in like manner. Every person who shall at any time within the space of a year before the election have subscribed the sum of £5 (*read* FIVE SHILLINGS) and upwards, shall have ten votes for every sum of £5 (*read* FIVE SHILLINGS) so subscribed by him, &c."

THE CAVENDISH SOCIETY.

We have much pleasure in informing our readers that the first volume about to be issued by this Society is in the press, consisting of *Chemical Memoirs and Reports.*

The translation of Gmelin's *Handbook of Chemistry* is in progress, and as the Council intend to produce one portion of the work during the present year, we advise those who may desire to make this valuable addition to their libraries, to lose no time in enrolling their names as subscribers. The number of copies printed will be regulated by the list of members. It will, therefore, be impossible to obtain the work after the number subscribed for, are delivered. It is the object of the Cavendish Society to produce translations of valuable works on Chemical subjects, which, without such aid, might never be published in this country. We, therefore, recommend the Institution to the notice of Chemists generally, inviting Members to suggest to the Council any works which may occur to them as possessing particular interest, which suggestions would always meet with due consideration.

NOTICES OF BOOKS.

A Manual of Elementary Chemistry, Theoretical and Practical. By George Fownes, F.R.S. Second Edition. John Churchill, Princes Street, London.

The character of this work is already known to our readers. In the publication of it the author particularly contemplated its use as a class-book for students in Chemistry, especially those attending his lectures, and we have frequently had occasion to recommend it as one of the best compendiums of the science of which it treats. The essential features of modern Chemistry are portrayed in it with much clearness and conciseness, the most important facts alone being stated, and the best received theories explained, with many well-directed cautions against the reception of the latter as established truths. There is no evidence throughout the book of an undue leaning to any peculiar theoretical views, or of a partiality for any particular department of the science to the neglect of others; but each part is sufficiently described, so as to give a well-defined conception of the whole.

The present edition has been somewhat increased in size, principally from additions to the organic part. Among the tables at the end is one "On the Proportions by weight of absolute or real Alcohol in 100 parts of Spirits of different Specific Gravities," the result of the author's recent researches just previously to his quitting England for a more congenial climate.

On Poisons, *in Relation to Medical Jurisprudence and Medicine.* By Alfred S. Taylor, F.R.S., Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital. London: John Churchill. Small 8vo, small print, pp. 855.

The *Manual of Medical Jurisprudence*, by the same author, has been so long before the public, and enjoys so good a repu-

tation, that the present enlarged treatise cannot fail to meet with a favourable reception. The work, although condensed into a comparatively small space, contains too much matter to admit of a hasty notice. We therefore defer our description of it until next month, and in the mean time introduce it to the notice of our readers as a valuable addition to Mr. Churchill's series of manuals.

THE POCKET FORMULARY, *and Synopsis of the British and Foreign Pharmacopœias, comprising standard and approved Formulæ for the Preparations and Compounds employed in Medical Practice.* By HENRY BEASLEY. Fourth Edition, corrected, improved, and enlarged. London: John Churchill. 12mo, pp. 455.

IF this book should continue to swell, as it has hitherto done, at each successive edition, it will be necessary for those who purchase it to enlarge their pockets, otherwise the term *Pocket Formulary* will no longer be applicable. We need add but little to what we have said respecting the former editions, except that the present one is more complete and explicit than its predecessors. As a book of reference, we recommend it to Chemists generally, and especially to those who are not in possession of a complete series of Pharmacopœias.

In speaking thus favourably of the work, we must not omit to impress emphatically on the minds of our readers a caution respecting the mischief which is likely to arise from indiscriminately adopting the formulæ in the same manner that they would if the work itself had been the Pharmacopœia of the country.

Some of the formulæ quoted by Mr. Beasley are given without any authority, others on the authority of individuals, others again are derived from various Hospitals and works, English and foreign, whose authority is quoted.

In using this, or any other collection of formulæ, the following rules must be observed :—Each formula is only applicable in the way of authority to the parties for whose guidance that particular formula was issued ; that is to say, in the case of prescriptions in England, the London Pharmacopœia is the only absolute authority. The Edinburgh and Dublin Pharmacopœias are in the same position as their respective kingdoms, and also in England so far as relates to such preparations as they respectively contain, but which are not contained in the London Pharmacopœia. The Paris Codex is the authority for French prescriptions, and the Pharmacopœias of other nations are the authorities in these nations respectively. The formulæ of an hospital, are applicable to prescriptions known to have been written in that particular hospital, but to no others; and the formulæ of any indi-

vidual, if ordered in a prescription, can only be adopted with safety, provided the name of the individual,* or a reference to the publication where such formulæ may be found, be contained in the prescription. In the interpretation of any prescription, the solution of one simple question, namely, *what is the intention of the prescriber?* must be settled beyond the possibility of a doubt, otherwise it is unsafe to prepare the prescription. So long as medical men prescribe only the preparations of the Pharmacopœia of the nation, no doubt can exist. If they deviate from this recognised authority, it is their duty to state explicitly what they mean, and if they fail to do so, it is the duty of the Chemist to apply to them for information, and not to act upon the imaginary authority of an indiscriminate collection of formulæ, derived from a variety of sources, and not intended for the guidance of the dispensing Chemist, except under the restrictions above stated.

With these precautions, Mr. Beasley's Formulary may safely and conveniently be used as a book of reference.

COMPANION TO THE BAROMETER; *a Table for showing what state of Weather will be likely to follow its Changes.* By JOHN UNDERWOOD, London. Published by Horne, Thornthwaite, and Wood, Newgate Street. Price 1*s.*, or varnished on roller, 2*s.* 6*d.*

NOT being "weatherwise," we are incompetent to offer an opinion respecting the accuracy of the deductions contained in this table; but it has been favourably noticed by Mr. Weeks, of Sandwich, who is an authority on meteorological subjects.

MEDICAL REFORM: *An Address read to the Harvean Society at the Opening of its Seventeenth Session.* By THOMAS HODGKIN, M.D., &c. London: John Churchill. 8vo, pp. 18.

IN the fourth volume of this Journal, page 39, we published an article by Dr. Hodgkin, on Medical Reform, containing what we considered to be in some respects, one of the most perspicuous and rational views of the subject. The address now before us makes allusion to this article, advocating, as the basis of any new regulations, the principle of a "state examination" to be compulsory on all practitioners in their respective departments, and an "academical" or "honorary examination" for those who are desirous and competent to take a higher rank. In this proposal we fully concur. We regret, however, that we are obliged to take exception to one part of the doctor's plan, namely, that of amalgamating into one college the General Practitioners and the Chemists, as the Pharmaceutical Body. For upwards of seven years we have been labouring in the endeavour to put an end to the jealousies and improve the relative position of these two bodies, which

* There may be a few exceptions to this general rule, as for instance, in the case of Liquor opii sedativus, and some other preparations equally well known throughout the country.

we are persuaded can only be effected by a complete and entire separation. We have seen "the happy family," in Trafalgar Square, consisting of owls, mice, hawks, pigeons, and a variety of small birds living in harmony in the same cage, which exhibition is pleasing from its rarity, and derives its practicability from the perfect discipline attainable in so small an establishment. But if the proprietor of the "happy family" were to collect together into one cage all the individuals comprised in the several genera of which his company consists, he would have an institution precisely analogous to that which Dr. Hodgkin proposes to found.

TO CORRESPONDENTS.

Mr. Baines (*Gloucester*) has sent us a sample of a powder similar to hydrarg. cum cretâ, but magnesia being substituted for chalk. This resembles the hydrarg. cum magnesia of the Dublin Pharmacopœia, in the preparation of which, however, manna is used and washed out with hot water at the end of the process.

"*Novis.*"—Sulphate of Barytes. See any elementary work on Chemistry.

P. (*Bury St. Edmunds*).—(1.) NOVARGENT. Dissolve oxide of silver in a solution of cyanide of potassium: mix it into a paste with chalk, and apply it in the same manner as plate powder.—(2.) FRUIT LOZENGES. Express the juice of currants (black, red, or mixed), evaporate to a proper consistence, adding sugar, and, if requisite, a little tartaric or citric acid.—(3.) Ask any oilman.

Indian Rubber Varnish for Boots.—M. P. S. (*Worcester*) sends the following in answer to *G. S.*, in the Journal for December 1st.:—℞ Indian rubber, ʒij.; mineral naphtha, ℥ij.; asphaltum, ½ oz.; ivory black, ½ oz.; sp. turpentine, 1 oz. Dissolve the Indian rubber in the naphtha and the asphaltum in the turpentine; mix the two solutions, and add the ivory black.

W. R.—We cannot account for the failure of the process of Dumas, for making chloroform, as mentioned by our Correspondent, except by a deviation from instructions. We advise those who are unaccustomed to such operations, to be particularly cautious in making experiments on this substance, as serious explosions sometimes occur.

H.—The instructions of the Pharmacopœia for making decoctum cinchonæ would of necessity lead to different results, according to the quantity operated upon.

R. H.—Cockles' pills are said to contain no mercury, but we have never examined them.

"*An Apprentice*" (*Bridgenorth*).—(1.) Liquor ammoniæ produces the effect alluded to, by neutralizing the acid.—(2.) The Apothecaries' Company, Liverpool, is a trading body, conferring no qualification.

A. B. C. (*Stourport*).—For a description of blue and green colours, applicable for colouring confectioners' ornaments, see vol. vi., pages 86 and 140 of this Journal.

"*An Associate*" (*Norwich*) inquires why the addition of burnt sugar (caramel) to sulphuric acid, considerably diluted, produces a precipitate. [It does not produce a precipitate.]

M. P. S., G. B.—Parnell's Elements of Chemical Analysis.

"*Studens*," *F. S. G., N. S.*, "*Tyro*," *C.*—See page 297 (Examinations).

"*An Associate.*"—The succus rhamni, sold by the trade for making the syrup, ought to be a simple expressed juice: we are not aware of any spices being added to it.

A. V. S. (*Leominster*).—We believe the best amalgam for the teeth consists of gold with a little mercury. A dentist would be the proper party to apply to for such information.

"*A Dispenser.*"—(1.) Dissolve the carbonate of soda in the infusion, then add the other ingredient.—(2.) The change of colour in ointment consisting of iodide of potassium and Spermaceti ointment has been frequently observed. It may be accounted for by the supposition that the wax has been bleached by chlorine, which would decompose the iodide of potassium.—(3.) Dr. Ure's New Dictionary is not yet published.

"*Juvenis.*"—(1.) Try potash.—(2.) No.—(3.) Sal volatile may be camphorated by dissolving camphor in it in any proportions that may be desired.—(4.) No.—(5.) The first.

We have received *Mr. W. Waldie's* paper on chloroform.

M. P. S.—Mr. Smith, whose chlorine fumigator was figured in our last Number, resides at No. 13, White Street, Borough.

"*A Member.*"—The Board of Excise will not sanction the sale of spirit of wine by Chemists, excepting for MEDICINAL USE, of which they ought to be prepared to produce evidence in case of need.

THE SPONGIO-PILINE.—A Correspondent at Portsmouth informs us. that "two parties are going about offering the Spongio-Piline for sale a trifle lower than the manufacturer's prices and only twenty-seven inches wide instead of thirty-six." On inquiry of the Patentee we find that the Spongio-Piline is not always of the same width, but the price is calculated by the square yard. When the width is less than thirty-six inches the length should be increased; so that the total number of square inches shall be equivalent to the square yard. When the yard is measured in length, without reference to the width, the regulation of the Patentee is violated. We are also informed that some parties retail the piline at an exorbitant price, which is impolitic as well as unfair. The retail price being fixed by the makers, and a liberal discount being allowed to the trade, the retail vendor is simply an agent and cannot honestly increase the price. The Spongio-Piline is now extensiveiy employed in the hospitals, and also by private patients. It is a very useful and convenient application for many purposes, and is likely to rise in public estimation. Every effort should be used to expose and check fraudulent practices, which, if allowed to prevail, would destroy the confidence of the public, and thus bring a valuable commodity into disrepute.

CHEAP PHYSIC.—A patient, fond of cheap physic, wrote lately to a Chemist, accusing him of imposition, because he had charged 1*s.* 2*d.* for some medicine which had been obtained elsewhere for 11*d.*; adding, "I must beg you either to refund the 3*d.*, or give back the 1*s.* 2*d.*; should this not be complied with, it will reflect great discredit on your establishment, and when I am better I will take means that the same is known."

We have received the price list of a Druggist in the country, who, we are informed, has failed five times in eight years. Judging from the scale of prices, we fear he will fail again.

In consequence of great press of matter, we give an extra sheet this month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. VIII.—FEBRUARY 1st, 1848.

INFORMATIONS UNDER THE MEDICINE STAMP ACT.

The agents of the Stamp Office have been busy during the past month in London and elsewhere, and numerous writs have been issued against Chemists for selling quinine wine, essence of sarsaparilla, Gregory's powder, cordial tincture of rhubarb, and a variety of other articles, without stamps.

In our number for June, 1846, we gave an analysis and explanation of the Act under which these proceedings are taken; and in April and May, 1847, we gave further information, with a report of a meeting of Chemists on the subject.

It appears, however, that these explanatory statements have been by some parties either forgotten or misunderstood: we therefore resume the subject in order to place the unwary on their guard. Instead of recapitulating what has been already stated, we advise all parties interested in the question, to refer to the three articles above mentioned (vol. v., Nos. 11 and 12, and vol. vi., No. 10), and to make themselves acquainted with the state of the law, which is there laid down. So long as the Medicine Stamp Acts remain in force, those who disregard this advice, and sell medicines, with recommendatory labels or hand-bills, and without stamps, are liable to penalties, and bring annoyance on themselves. The officers of Somerset House make periodical visits to Chemists, for the purpose of ascertaining whether the law is duly observed, and the forgetfulness or inadvertence of some of our members gives rise to an *epidemic* of writs on such occasions, which, like other epidemics, falls heavily on those who are susceptible of the attack.

In many cases which have been referred to us during the past month, the parties were not aware that they had been violating the law, but on investigation, this was found to be the case. We therefore advised them to memorialize the Commissioners, praying for indulgence, on the ground that the offence had been committed unintentionally, and with no idea of defrauding the revenue. The result was generally a mitigated penalty of £1 or £2, according to circumstances. It is *rumoured* that some parties have been

fined to the full amount of the penalty, viz. £10, £20, and even £40, according to the number of articles sold. These cases, however, have not been officially reported to the Council or to the Editor.

We have received from different quarters, a variety of labels and printed bills, with inquiries whether the medicines so described are liable to the stamp duty. In order to explain more fully the principle involved in this inquiry, we may give a few examples: Fluid Extract or Essence of Sarsaparilla, is recommended "in cases of debility, cutaneous eruptions, &c.;" Dr. Gregory's Stomachic Powder, "for affections of the stomach, such as acidity, flatulency, &c.;" Chemical Essence "for the toothache;" Camphorated Family Liniment, "an effectual cure for chilblains;" Family Aperient Mixture, "one of the most useful purgatives known, at the commencement of all febrile and inflammatory diseases;" Rhubarb and Ginger Pills, "for preventing attacks of bile and gout;" Essence of Ginger, "for heartburn, flatulence, &c."

In all these and similar cases it is obvious that a stamp must be affixed, although the same medicines might be sold without the stamp if not recommended for "the cure or prevention of any disorder, malady, ailment, or complaint, incident to, or in anywise affecting the human body." Some of the labels are ingeniously worded, apparently with the intention of conveying the meaning desired without a positive recommendation for any specified disorder. For instance, Dr. Collier's orange wine of quinine is recommended "as being superior to bark, the properties of which are too well known to require any comment." This would appear to be safe, as no disorder is mentioned, and the recommendation has reference rather to the elegance of the preparation than to its medicinal qualities. But the label proceeds to state that the remedy "will be found more grateful to weak and delicate stomachs, by giving strength and vigour to the constitution." Here a disorder,—namely, weakness of stomach—is mentioned: the line is passed, and a stamp is required. Tooth-powder is recommended "for beautifying the teeth and preserving the gums." Here no allusion is made to any disorder. The term "preserving the gums," is vague and equivocal. Does it mean preventing disorders of the gums, or does it mean that the powder acts chemically on the tartar of the teeth (which otherwise might injure the gums without producing any positive disease)? We think neither Mr. Tim nor his clerk* would construe this case as coming within the terms of the Act. But in some of the labels transmitted to us, the following words are

* See vol. vi., page 456.

added: "its highly antiseptic properties render it valuable for correcting the fœtor arising from carious teeth." This rather increases the difficulty, for while decay of the teeth may be considered a disease, it may possibly be questioned whether a tooth is a part of the body. But even if this latter plea were tenable, it is neither satisfactory nor proper to evade the law by means of a quibble, and we think the omission of any words of doubtful import is in all these cases desirable. The allusion to fœtor and carious teeth, on the lid of a box of tooth-powder on a lady's toilet-table, is unnecessary, and by no means attractive.

Descending lower in the scale of cosmetics, we have camphor cream, "for chapped hands;" pomade nonpareil, "for beautifying and preserving the hair;" almond paste, "for softening the skin, making it white, and preserving it from chapping:" and we are called upon to decide whether chapped hands, hard skin, and loss of hair, be disorders or not according to the meaning of the Act. We have never heard of any writs for selling articles of this description without a stamp; and, therefore, conclude that Mr. Tim and his clerk agree with us in opinion, although we shall follow their example by not committing ourselves in writing.

From the above remarks it is clear, that the only difficulty in the interpretation of the Act arises from the endeavour to evade its penalties, by "sailing as near the wind as possible" without positively infringing the strict letter of the law; and those who think proper to incur this risk must take the consequences, if they happen, by accident, to go a step too far.

Some of our correspondents have drawn our attention to the apparent inconsistency of making the stamp duty dependent on the addition of instructions as to the properties of the medicine, which instructions, it is contended, are merely designed to benefit the public and to prevent mischief, by defining the cases in which each particular remedy is proper. It appears, at first sight, to be a hardship upon the vendor, that he is subjected to a tax for taking this precaution for the welfare of his customers. It must not be forgotten, however, that this acceptable information tends to increase the sale of the medicine, and thus to benefit the vendor, while the amount of the stamp is added to the price, and paid by the purchaser. We are not disposed to advocate the stamp duty, but so long as the law continues in force, it is incumbent upon us to explain, so far as we are able, the principle on which this tax is regulated; and reviewing the whole question of recommendatory labels and handbills, we doubt whether any amendment, short of a repeal of the Acts, would obviate the inconvenience in question.

Any person who reads dispassionately the printed directions

appended to *quack medicines* generally, must be convinced that a majority of these are designed rather to benefit the vendor than the purchaser. When we see a remedy extolled as a specific for a list of disorders, occupying ten or twenty lines of small print—some of these disorders bearing no analogy to the others, and many of them liable to much fluctuation, and, consequently, requiring varied treatment—we can scarcely suppose that the recommendation is designed for any other purpose than to act on the credulity of the public. In such cases the stamp duty cannot be considered a hardship. The parties concerned in this kind of traffic can afford to contribute to the revenue out of the profit derived from their indefatigable system of puffing. If all remedies, the composition of which is known, were exempted, any quack medicine vendor might evade the tax, by publishing his formula as soon as he had puffed his nostrum into notoriety; and by omitting some essential part of the formula, which fraud would be difficult of detection, he might continue to puff his own preparation as being better than counterfeits, *because* more carefully prepared. Even if the exemption were restricted to the preparations of the Pharmacopœia, the quack would still have a wide field for his researches: he might gull the public to a great extent by vending an old remedy under a new name, with the usual puff; and when called to account, he might screen himself under the assertion that his nostrum was only tincture of rhubarb, or squill pill, very carefully prepared according to the Pharmacopœia.

It would, therefore, be very difficult to concede to the regular Chemist an exemption from the stamp duty, in the sale of ordinary medicines with explanatory directions, without conferring the same privilege on the quack, and thus entirely frustrating the object of the tax. This difficulty is still more apparent when we consider that there is unfortunately, in this country, no line of separation between regular Chemists and quacks—an evil which will continue to exist until the Pharmaceutical body is placed in its proper position by Act of Parliament.

THE BENEVOLENT FUND.

In our number for November last year, we announced the determination of the Council to bring into early circulation the income derivable from the Benevolent Fund, without waiting for the accumulation of capital provided for in the original bye-law. In the copy then given of the new bye-law, which has been adopted for regulating the distribution of the Fund, an *erratum* occurred, which was corrected in our last number (£5 having been accidentally printed instead of 5*s*. in the latter end of the ninth section).

We are induced again to direct the attention of our readers to the subject, from a case which has just come to our knowledge, which will serve as a striking illustration of the value of the Fund, and is calculated to excite the sympathies and stimulate the zeal of our Members generally in this charitable object.

Mr. Stevens, one of the original Members of the Pharmaceutical Society, who had for some years been carrying on a respectable and not unsuccessful business in Regent Street, was obliged to relinquish his business in January, 1844, on account of severe and protracted illness. He and his wife shortly afterwards died, at the age of thirty, leaving his four children almost destitute. One of them is a candidate for admission into the Orphan Asylum at Clapton, and as it is probable that many of our readers are subscribers to this charity, we mention the circumstance in the hope that those whose votes are disengaged, will give their support to this unfortunate case.

Had the life and health of Mr. Stevens been spared, there is every reason to believe that he would have been enabled to provide for his family, and retain the respectable and independent position which he had hitherto enjoyed. But illness is a dispensation which none of us can foresee, and few persons sufficiently prize the blessing of health, until they are made sensible of its value by the privation. In this case we see a calamity to which all are more or less liable, in spite of the most energetic exertions and industry, and which when it arrives points out in a forcible manner, the importance of making provision in times of prosperity for the possibility of such an occurrence We have, in the present instance, given the particulars with the name and address, in the belief that one individual case of this description, which may be taken as the type of many others, is more likely to come home to the feelings of our readers than a long argument on the abstract principles of prudence, charity, and benevolence.

We may mention another instance—omitting the name, as the party is still living. We allude to a Chemist who has for above half a century carried on business in London. He was at one

time living in affluence, and as he possessed a scientific and practical knowledge of Chemistry, he devoted some attention successfully to the manufacturing department. Having a very large family to support, he was unable to secure that provision for his advanced years, which, under other circumstances, might have been attended with no difficulty. As the infirmities of age increased his resources failed him, he was unable to continue his business, and was obliged to look out for a situation—a task almost hopeless for a man past the age of seventy. Cases might be multiplied, but one more will suffice : it is that of a Chemist, who having been in practice before 1815, is entitled to practise as an Apothecary, but has for some years past devoted himself entirely to the dispensing of medicines. Protracted illness deprived him of all he possessed, and he is now in the workhouse. We have made diligent inquiry respecting his character, which appears to be without reproach, and several endeavours have been made to find him a situation ; but his age (above sixty) is an obstacle, and he is doomed to the painful alternative — parochial relief or starvation.

To those whose prospects of realizing an independence are not encouraging, cases like these ought to serve as an inducement from prudential motives to contribute their mite towards the support of a fund, which, in the event of an unforeseen calamity, may possibly be the means of saving them from destitution. But we address with no less hope of success those whose independent resources are such as to leave no cause for uneasiness respecting their pecuniary prospects, and to these we appeal for sympathy and liberality on behalf of our less fortunate brethren.

A contribution of 5*s*. or 10*s*. a year from the Members and Associates of the Society, aided by such extraneous subscriptions or donations as we might hope to obtain, if the nature and objects of the fund were more generally known, would in a short space of time afford the means of alleviating a large amount of distress, and thus shed a ray of sunshine on many who might otherwise starve in despair or suffer in silence.

In our former notice of this subject we alluded to the dinner which has been proposed for the benefit of the Benevolent Fund. We have now the satisfaction of adding, that Mr. Herring has liberally offered to provide a room for the occasion at the Albion, in Aldersgate Street, a house admirably adapted for the purpose.

Those who may be disposed to act as Stewards are requested to forward their names to Mr. Herring, 40, Aldersgate Street, or to the Editor of this Journal. We hope to be able to announce the day with further particulars next month.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

WEDNESDAY, JANUARY 12th, 1848,

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

ON FLUID CAMPHOR.

BY SIR J. MURRAY.

I WISH to bring before the notice of the PHARMACEUTICAL SOCIETY, a *permanent* solution of camphor, which I submitted in my Thesis at Edinburgh to the Faculty of that University in 1838. I have had so many proofs of its superiority over crude camphor, and its ordinary preparations, that I have been induced to bring it out more prominently before the medical profession and the public. The proportions found most beneficial during twenty years' experience, are three grains of camphor and six grains of bicarbonate of magnesia to each ounce of the fluid. The magnesia is shown by boiling the liquor, the camphor by saturating a glass of the solution with muriate of soda or any dry salt. By thus abstracting part of the water, the camphor is set free, and rises in flakes, like snow, forming a frost-work crust on the surface.

This is a homely experiment, but it is more speedy at a meeting or lecture than more elaborate analysis. The specific gravity of the fluid camphor is 10.026, water being 10.000. The very moderate proportion of magnesia does not interfere with the virtues of the camphor; but on the contrary, by neutralizing gastric acids, the properties of the camphor are more favourably displayed. This has been particularly observed during the present low fevers and bowel complaints, when the fluid was used alone, or as the vehicle for laudanum, tonics, or astringents.

Perhaps, a few remarks may be allowed respecting the *remedial agency* of fluid camphor. It has undoubtedly succeeded in soothing and composing the nerves, in cases where solid camphor irritated and disturbed them.

When exhibited in powder, pill, or bolus, or, what is nearly as bad, in stimulating tinctures, the camphor acts as a local acrid, inflicting pungent pain of the mucous membrane lining the alimentary passages.

The modes of administering camphor having remained almost without any improvement since the days of the Arabian writers,

caused great diversity of opinion, not only as to its medicinal qualities, but also its proper doses.

Further, its action being transitory, part of its influence passed away from its usual formulæ before the whole drug became dissolved or absorbable in the stomach; an evanescent medicine should be taken in such a ready and available state, that its entire agency may be promptly brought to bear, without waiting for the uncertain or partial delay of digestion in the stomach.

It is needless to occupy time by further observations, it being more desirable to obtain than to offer opinion; but it may be remarked, that whatever character camphor has enjoyed for many ages, its true medicinal value must be greatly enhanced, when administered in a certain, fixed, uniform, and elegant manner, rather than the unpleasant and uncertain methods hitherto in use.

ON MURIATE OF OPIUM.

BY J. G. NICHOL, M.D., OF CROOK, DURHAM.

(Communicated through Dr. Pereira.)

During the last ten or twelve years I have made and prescribed a solution of opium, which I think is not mentioned in any work on Materia Medica with which I am acquainted. I use powdered Turkey opium and water, pretty strongly acidulated with muriatic acid. I have found, by experience, that this is the best anodyne I am acquainted with. I see, by Dr. Pereira's Materia Medica, that mention is made of Dr. Porter's solution of opium in citric acid. I made and used the same sort of preparation ten years ago; but it did not answer. It caused a great deal of headache and other unpleasant symptoms; moreover it became muddy, and appeared to be decomposed; therefore, I gave up using it. I have called this preparation of mine Muriate of Opium, but perhaps it is not a very correct name. I may mention that I prepared solutions of opium with acetic, nitric, sulphuric, citric, tartaric, and muriatic acids, and also prescribed them, but the muriatic solution was vastly superior to any one in every respect. All of them produced *headache* with the exception of the *muriatic*. I prefer muriate of opium to the tincture, wine, or powder of opium, and also to the muriate and acetate of morphia; in fact, to any other preparation of opium. It never makes my head ache, but all the other preparations do.

My preparation is made according to the following formula:—

Take of The best powdered Opium, ℥j.
Muriatic Acid, ℥j.
Distilled Water, ℥xx. Mix.

Shake this mixture very frequently every day, during fourteen days, then strain and filter. The dose is from twenty to forty

drops, according to circumstances. Many of my medical friends have tried this preparation, and they highly approve of it. I have taken the liberty of sending you a small quantity as a specimen.

A paper was read

ON THE CAUSES CONTRIBUTING TO THE PRODUCTION OF DISEASE THROUGH ATMOSPHERIC AGENCY.

BY MR. SMITH, OF WHITE STREET, BOROUGH.

In this paper, which is too long for publication, the author, after describing the various causes which tend to produce impure atmosphere, and quoting from several authors the opinions entertained as to the influence of the different kinds of atmospheric impurity and disturbance upon health, recapitulated the inferences which he had deduced from the examination of the subject, as follows :—

1. That a variety of agencies are constantly operating to produce impurity of the atmosphere, and that one or more of these may exist to such an extent as to produce epidemic disease, in which case the exciting cause of disease is called Miasm.

2. That putrefaction of organic substances is the most frequent cause of miasm.

3. That heat and moisture favour putrefaction, and thereby promote the impurity of the atmosphere, but that heat or moisture alone will not produce this effect.

4. That the atmosphere is generally in a negative state of electricity during, and for some time preceding, the development of pestilence.

5. That some winds have the property of disinfecting the atmosphere, and that such winds are charged with positive electricity.

6. That other winds, containing much moisture, attend epidemical diseases, and that these occasion a depression of the barometer.

7. That rain sometimes promotes the formation of miasma by inducing putrefactive fermentation, but that it also sometimes tends to the purification of the atmosphere.

8. That thunderstorms and earthquakes have sometimes preceded and accompanied pestilence ; but that in several instances the occurrence of these phenomena has been immediately followed by a cessation of prevailing disease.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MICROSCOPIC VEGETATIONS DEVELOPED IN PHARMACEUTICAL LIQUIDS.

BY JONATHAN PEREIRA, M.D., F.R.S.

Continued from page 343.

Every Pharmaceutist must be acquainted with the decomposition which solutions of tartaric acid and the tartrates undergo by keeping. In every case which I have yet examined, a flocculent mucilaginous matter is found in the decomposing solution, and when we submit this matter to a microscopic examination, it is found to consist of a minute filamentous plant. Kützing (*Phycologia generalis*) refers the plant (which he admits that he has imperfectly figured) found in the solution of emetic tartar, to the natural order *Algæ*, and calls it *Sirocrocis stibica;* but if, as I believe, the same plant is common to tartaric acid and the tartrates generally, it might more appropriately be denominated *Sirocrocis tartarica.*

The same distinguished naturalist has also described several algaceous plants, which are developed in solutions of *polychrome.**

The vegetations met with in solutions of this principle vary according as the solution is pure or impure; and, in the latter case, according to the nature of the foreign substances present. Thus Kützing found, that *Hygrocrosis catenata* became developed in a pure solution of polychrome; but in a solution containing chloride of iron another species was formed, namely *Hygrocrosis nebulosa.* When sulphate of copper was substituted for chloride of iron, *Hygrocrosis cuprica* was produced; but when, instead of either of these metallic salts, emetic tartar was added to the solution, *Hydrocrosis undula* became developed. In some cases, species of another genus (*Leptomitus*) make their appearance. Thus, in a solution of polychrome containing chloride of gold, *Leptomitus violaceus* was formed; while in another containing both chloride of gold and chloride of tin, *Leptomitus aureo-stannicus* grew.

These facts are curious and interesting, and on the whole, are favourable to the doctrine of a *generatio primitiva.* They show that the addition of small quantities of different substances to an organic solution in general call forth different forms of vegetable life. It is proper, however, to add that more than one species is not unfrequently found in the same liquid, and that the same species is often found growing in different liquids.

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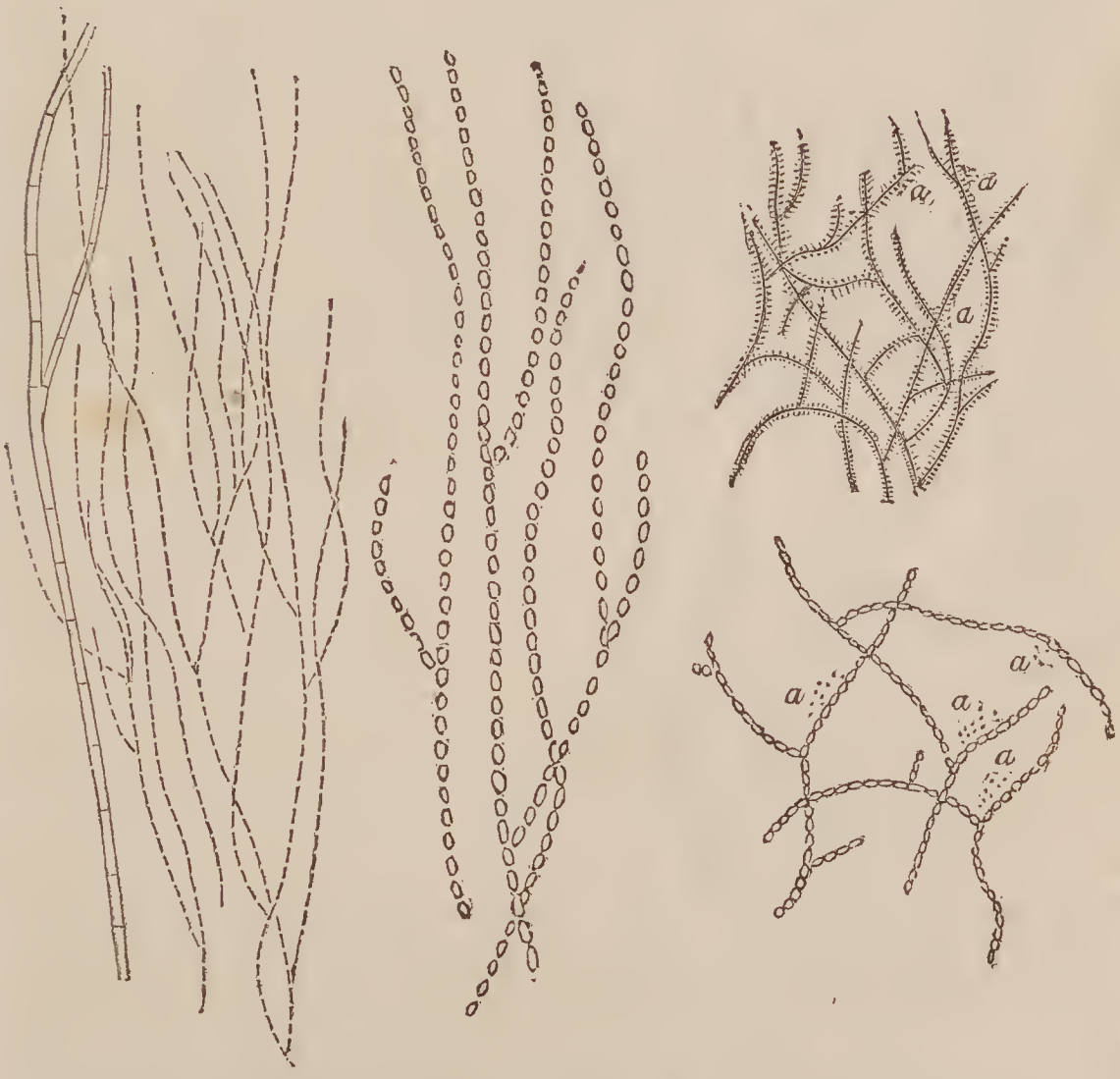
* Polychrome is an organic substance allied to the colouring principles, and which has received its name from the remarkable play of colours which very dilute aqueous solutions of it present, (πολύχρωμος *many coloured.*) It has also been termed *Schillerstoff* (versicoloured matter), *Æsculin* (because it has been procured from the *Æsculus hippocastanum* (or horse-chestnut), or *Enallochrom* (from ἔναλλος *changed*, and χρῶμα *colour.* It has been obtained from quassia wood, the horse-chestnut, and other sources. Its composition, according to Trommsdorff jun., is C_{16} H_9 O_{10}.

In the French translation of Kützing's paper, the word *polychrom* has been rendered *chromic acid.*

There is another point of view in which the production of these vegetations presents much interest. I allude now to their developement in metallic solutions usually deleterious to animal and vegetable life. Kützing has described them as being produced in solutions of copper, antimony, gold, and tin; and I once saw a filamentous plant (*Hygrocrocis ?*) developed and growing in a solution of arsenious acid; and on another occasion in a liquid used for the preservation of animal substances, and into which bichloride of mercury had been put.

8. *Vegetation in a watery pure solution of Polychrome.*—This forms an olive-coloured mucilaginous substance, which in loose, delicate, cloudy flocculi render the solution turbid. When examined by the microscope it is found to consist of branching, dichotomous distinctly articulated filaments, the joints of which are oblong or elliptical. The branches of the younger plants are straight, long, and slender (fig. 13), while those of the older ones are squarrose and short (fig. 14), and bear small masses of spores (*a*). This plant Kützing calls *Hygrocrocis catenata.*

Fig. 13. Fig. 14.

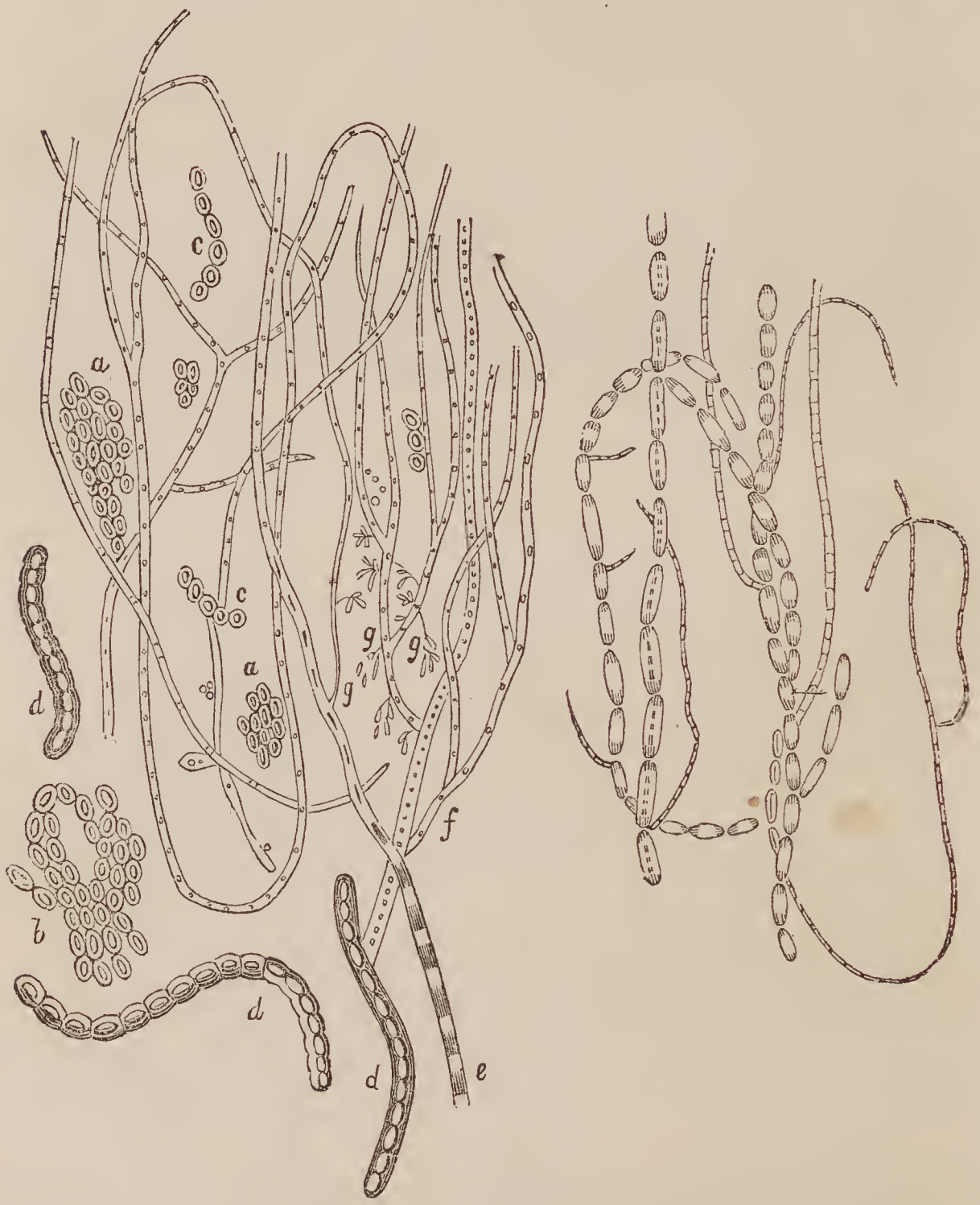


Hygrocrocis catenata, growing in a watery solution of pure Polychrome.

9. *Vegetation in a solution of Polychrome containing Chloride of Gold.*—This substance consists of a fibrous brownish violet mucilaginous mass, deposited on the bottom of the vessel. Examined by the

microscope in the young state (fig. 15) it was seen to consist of a confused mass of mostly dichotomous, branching slender filaments. The joints of the principal stems present a broad transverse zone.

Fig. 15. Fig. 16.



Leptomitus violaceus, growing in a solution of Polychrome containing Chloride of Gold.

The branches and more delicate filaments contain some hyaline scarcely visible globules. Between the filaments we perceive globules (*a*) about one and a half times or twice as large as yeast globules; they are usually moniliform, and have a thick mucilaginous envelope and hyaline border (*b*, *c*, *d*): they are probably seeds (*spermatia*). The fig. *g*. represents a small parasite growing on the above described filaments. Fig. 16 represents the plant at a more advanced period of its growth, and when it is susceptible of being more minutely examined.

This plant is called by Kützing *Leptomitus violaceus*.

10. *Vegetation in a solution of Polychrome containing the Chloride of Gold and Chloride of Tin.*—This plant (fig. 17) consists of a brownish-violet or olive-coloured mucilaginous flocculent mass, composed of different kinds of filaments mixed with single globules, indicating the commencement of the plant. Some of the filaments are very thin, and commonly not jointed, others are stronger, torrulose, or like a string of pearls. When carefully examined, the thinner unjointed ones were in partly the branches, partly the extremities of the stronger filaments.

Fig. 17.

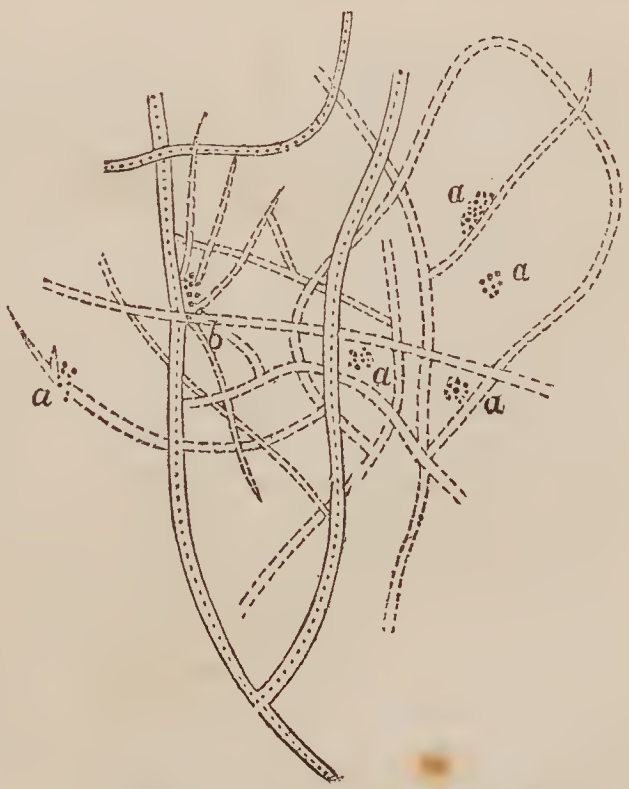
Leptomitus aureo-stannicus, growing in a solution of Polychrome containing the Chlorides of Gold and Tin.

The figures *a*, *b*, *c*, *d*, *e*, show very clearly how the filaments are developed from the globules.

In this case, metallic gold mixed with some oxide of tin was precipitated.

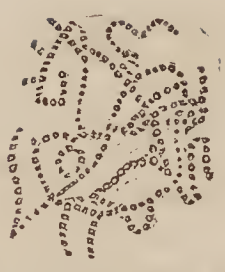
11. *Vegetation in a watery solution of Polychrome mixed with Chloride of Tin.*—This solution kept for some time deposited at the bottom of the vessel some oxide of tin. Upon this latter there developed a yellow and mucilaginous vegetation, formed of filaments, (fig. 18) with articulated branches. Externally, these filaments are furnished here and there with small and globular spores arranged in clusters (*a*) from which young yellow filaments are developed (*b*), but their minuteness was such that Kützing could not perceive their structure.

Fig. 18.



Vegetation in a solution of Polychrome containing Chloride of Tin.

Fig. 19.



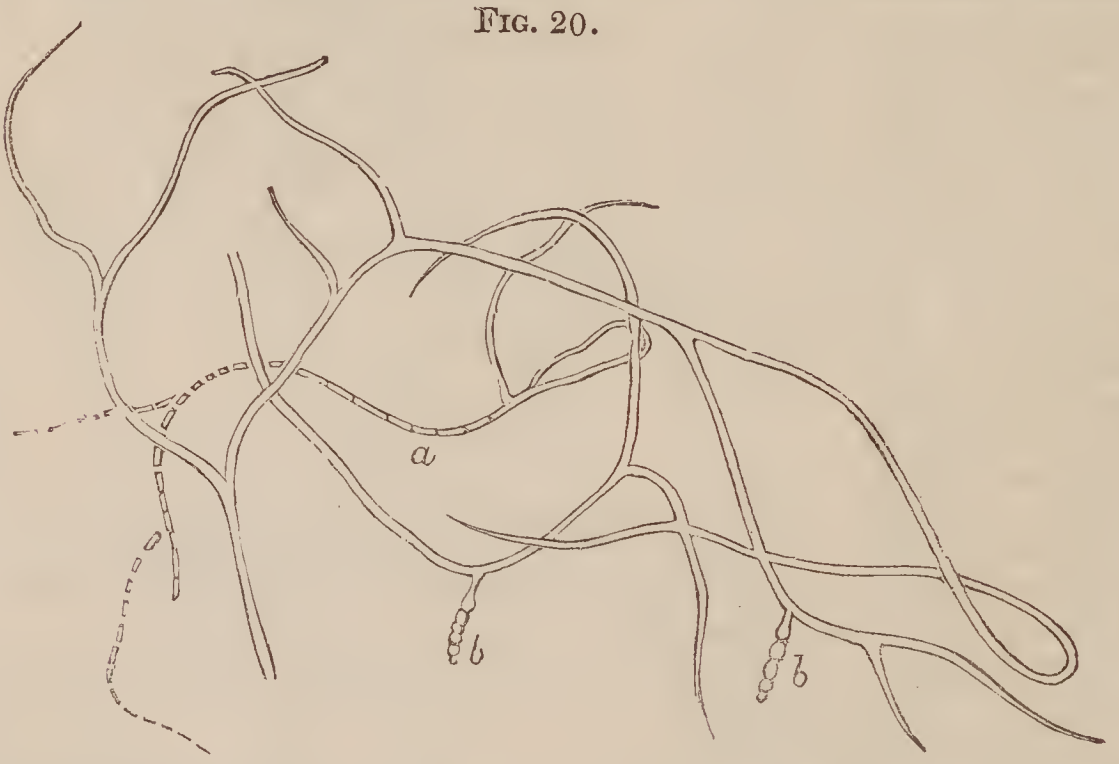
Hygrocrocis undula; growing in a solution of Polychrome containing Emetic Tartar.

12. *Vegetation in a solution of Polychrome mixed with Emetic Tartar.*—This plant (fig. 19), called by Kützing *Hygrocrocis undula,* formed a very soft, slightly coherent, and almost fluid mucus. When viewed by the microscope it was seen to consist of small, short, pearly, moniliform filaments, the globules composing which were five times smaller than those of yeast.

A similar vegetation was also observed in a *solution of polychrome containing chromic acid.*

13. *Vegetation in a solution of Polychrome containing Sulphuret of Ammonium.*—(Fig. 20). This consists of a dark brown, fibrous,

Fig. 20.



slightly mucilaginous tissue, which, when examined by the microscope, was perceived to consist of strong dichotomous, branching, opake, brown filaments, which are slightly or not at all articulated. Intermixed with these was observed an opake fibre (*a*), composed of globular brown joints, and also jointed short branches, on the stronger unjointed filaments (*b*).

Fig. 21.

Hygrocrocis cuprica, growing in a solution of Polychrome mixed with Sulphate of Copper.

14. *Vegetation in a solution of Polychrome mixed with Sulphate of Copper.* This forms a very mucilaginous mass on the bottom of the vessel. It consists of very thin, mostly dichotomous, and branching filaments, which at certain distances contain some small hyaline globules (fig. 21). Externally it is supplied with oblong spores (*c*). This formation is seen to consist of extremely minute globules (*a*), of which (*b*) furnishes the proof. Kützing has named this plant the *Hygrocrocis cuprica.*

(*To be continued.*)

ON THE VALUE IN ABSOLUTE ALCOHOL OF SPIRITS OF DIFFERENT SPECIFIC GRAVITIES.

BY GEORGE FOWNES, ESQ., F.R.S.
Professor of Practical Chemistry, in University College, London.

HAVING been for some months past occupied with experiments on the fermentation of sugar and molasses, and having found it necessary to construct for this purpose a new table of the quantity per centum by weight of absolute alcohol contained in spirits of different specific gravities, I venture to lay the same before the Royal Society, hoping that it may be found generally useful in inquiries of this kind, and also for other purposes.

The table was formed synthetically; absolute alcohol and distilled water were weighed out in the required proportions, mixed in small well-stopped bottles, and well-shaken together. After standing three or four days, the mixtures were brought to the temperature of 60° Fahr. exactly, and their specific gravities determined with great care. After the lapse of two or three days more, this last-named operation was repeated, but in no case was it observed that any further contraction had occurred. Neither was the specific gravity of a mixture, containing nearly equal parts alcohol and water which had been so examined, changed by being enclosed in a strong accurately-stoppered bottle, and heated for some time to a temperature above its boiling-point.

In this manner, each alternate number in the table (each even number) was obtained by direct experiment; the others were then interpolated. When completed, the table was examined by various methods calculated to test its accuracy, but no error of sufficient magnitude to limit its usefulness was detected.

The absolute alcohol employed in these experiments, was prepared in the following manner:—the strongest rectified spirit was agitated with half its weight of carbonate of potash deprived of water of crystalization, and left in contact with the salt some days. It was then decanted upon half its weight of powdered quicklime, made from black marble, contained in a metal still which could be perfectly closed. The mixture of spirit and lime was retained in a warm situation for a week or thereabouts, and then distilled by means of a water-bath. By this treatment the specific gravity of the alcohol was generally reduced to .796, or even below, and by a repetition of the process of digestion with powdered lime and re-distillation, the last traces of water were removed. In this manner, without difficulty, the very considerable quantity of absolute alcohol required for the experiments was procured.

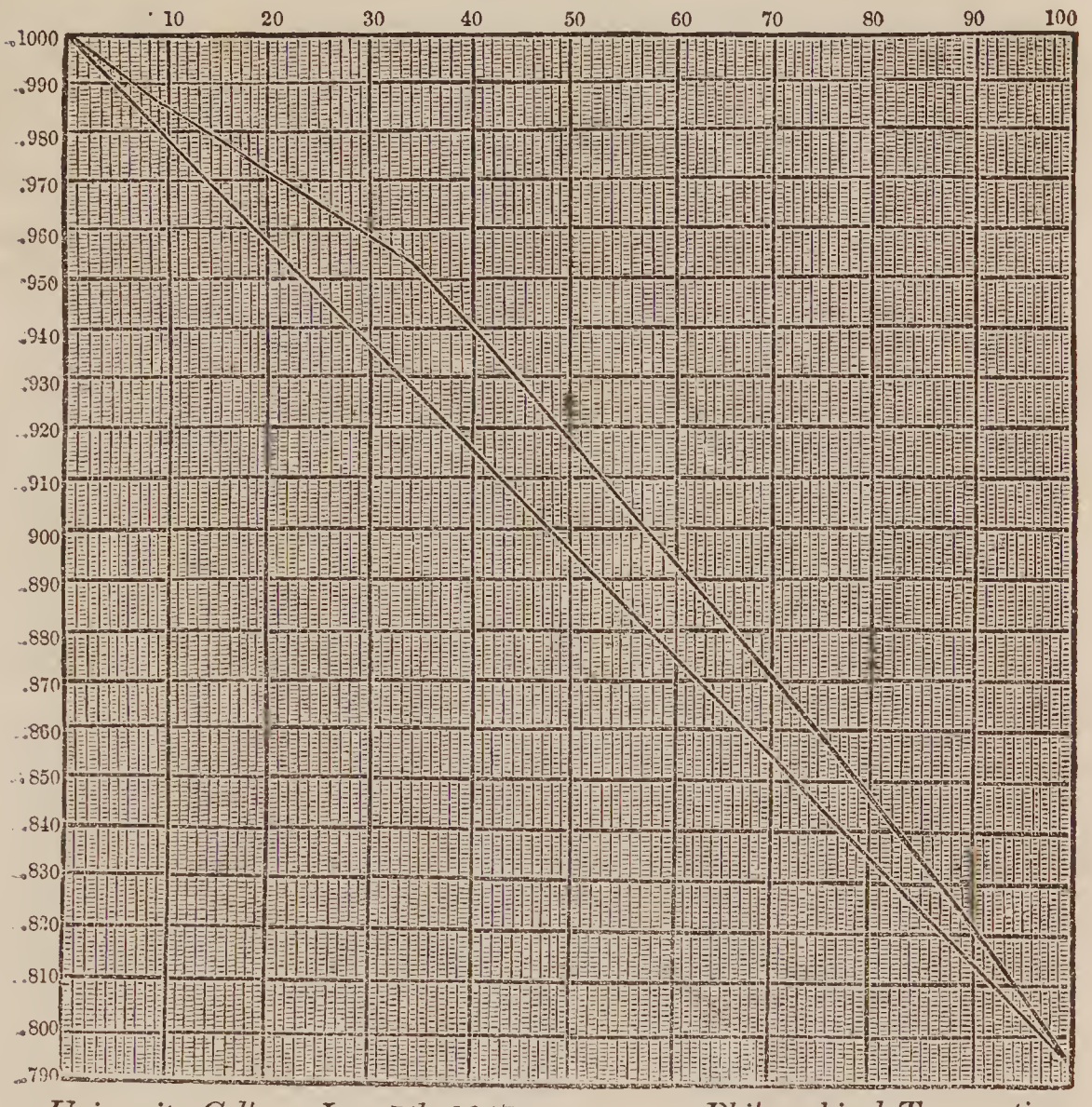
Absolute alcohol thus obtained, has the specific gravity .7938 at 60° Fahr.; it is extremely expansible by heat, which renders the determination of its exact specific gravity difficult and troublesome when the temperature of the room is either above or below 60°. The same remark applies to the mixtures of alcohol and water extending over more than half the table, the most minute precautions regarding temperature being necessary to avoid serious errors. In a glass retort, containing pieces of copper foil, absolute alcohol boils at 177° Fahr., the barometer standing at 29.75 inches. Lastly, when analysed by combustion with oxide of copper, it yields numbers representing the proportions of carbon and hydrogen present, so closely agreeing with those required by theory, as to leave no doubt of its purity and freedom from all admixture.

The contraction of volume suffered by various mixtures of alcohol and water, may be rendered obvious by comparing the actual specific gravities of such mixtures, with the calculated mean specific gravities. In the accompanying plate, in which the vertical lines represent the per-centage of alcohol by weight, and the horizontal lines the specific gravities, the calculated mean specific gravities of the mixtures are seen to form a straight diagonal line from corner to corner, while the actual specific gravities form an irregular curve with upward convexity, rising quickly to near its maximum deviation at 30 per cent., running nearly parallel with the other line to 50 per cent, and thence declining until it reaches the extremity of the scale.

TABLE of the proportion by weight of real or absolute Alcohol contained in 100 parts of spirits of different specific gravities at the temperature of 60° Fahr.

Specific gravity.	Per-centage of alcohol.	Specific gravity.	Per-centage of alcohol.	Specific gravity.	Per-centage of alcohol.
.9991	0.5	.9511	34	.8769	68
.9981	1	.9490	35	.8745	69
.9965	2	.9470	36	.8721	70
.9947	3	.9452	37	.8696	71
.9930	4	.9434	38	.8672	72
.9914	5	.9416	39	.8649	73
.9898	6	.9396	40	.8625	74
.9884	7	.9376	41	.8603	75
.9869	8	.9356	42	.8581	76
.9855	9	.9335	43	.8557	77
.9841	10	.9314	44	.8533	78
.9828	11	.9292	45	.8508	79
.9815	12	.9270	46	.8483	80
.9802	13	.9249	47	.8459	81
.9789	14	.9228	48	.8434	82
.9778	15	.9206	49	.8408	83
.9766	16	.9184	50	.8382	84
.9753	17	.9160	51	.8357	85
.9741	18	.9135	52	.8331	86
.9728	19	.9113	53	.8305	87
.9716	20	.9090	54	.8279	88
.9704	21	.9069	55	.8254	89
.9691	22	.9047	56	.8228	90
.9678	23	.9025	57	.8199	91
.9665	24	.9001	58	.8172	92
.9652	25	.8979	59	.8145	93
.9638	26	.8956	60	.8118	94
.9623	27	.8932	61	.8089	95
.9609	28	.8908	62	.8061	96
.9593	29	.8886	63	.8031	97
.9578	30	.8863	64	.8001	98
.9560	31	.8840	65	.7969	99
.9544	32	.8816	66	.7938	100
.9528	33	.8793	67		

Comparison of mean and actual specific gravities of various mixtures of Alcohol and Water.



University College, June 7th, 1847. *Philosophical Transactions.*

SECOND LECTURE

ON THE ANATOMY AND PHYSIOLOGY OF THE HUMAN CIRCULATION,

Delivered before the Members of the Bristol Chemists' Association, December 21.

BY EDWARD MARTIN, M.R.C.S.

Mr. Chairman and Gentlemen,

In considering the anatomical arrangement and structure of the human vascular system, what we have hitherto examined may be viewed as the general rules of the subject, and I now have briefly to notice one or two special exceptions to those rules before I pass on to treat of the physiology.

You will remember the law I gave you, that arteries commence by trunks, and divide into branches during their progress towards the point of distribution, while veins commence by radicles, and converge in their course into trunks. But this law, like most others, is not entirely universal. Thus, for instance, the basilar artery, which supplies the back

part of the brain, is a trunk formed by the junction of two smaller ones coming from opposite sides of the body, the intention of which is obvious. The flow of blood to this artery, nourishing as it does so vital an organ as the brain, requires to be removed as far as possible from any chance of failure, for the deprivation of the living fluid, even for the time required to establish a collateral circulation, would here be of serious moment. Nature, consequently, gives it two sources of supply, so far removed in their origin from each other, that any cause affecting the one would not be likely to extend sufficiently to likewise act on the other.

It is, however, in the venous system that the grand exception of this class is found, viz., in the portal vein, which collects the venous blood that has been circulated through the walls of the stomach and intestines, and carries it to the liver to be in that organ again distributed.

This portal vein possesses an arrangement unlike any other vessel. From the capillary network of the stomach, intestines, and other organs engaged in the preparation of the food, its radicles commence, and as, in all other veins, converge to form a trunk; but here the analogy ceases, and its further course is rather that of an artery. The trunk, passing to the under side of the liver, enters that large gland by a fissure named the "porta," or gate (whence the name "portal vein"), and having so entered it, divides and re-divides, ramifies in every direction, and finally ends by its ultimate branches being lost in the web of capillaries pervading the entire structure, and enclosing in their meshes the minute lobules which secrete the bile from the blood, which this *vena portæ* brings to them.

In addition to this portal circulation, the liver, like other structures, has an artery supplying blood (for nutrition) and veins which return into the general venous system, the contents both of this artery and of the portal vessel. The *vena portæ* is therefore without any analogue, and must be viewed as a vessel superadded to the circulation of a gland, which would be, in all respects, as perfect as that of other secreting structures without it; since in all glands but this one the secretion takes place from the arterial blood supplied for nutrition. We are, then, naturally led to ask, "What is the intention of this peculiar organization?" and to explain this a few words on the function of the liver are necessary.

The renewal which the various tissues of the body are continually undergoing, has for its chief object the counteraction of the decay into which they would otherwise pass, and it is obviously required that a means should be provided for conveying away the waste as well as supplying the new material. The taking up of these products of disintegration is effected partly by the veins and partly by the lymphatics (one of the two sets of absorbents I shall presently speak of). With regard to the respective parts which the veins and lymphatics take in this duty, there has been much dispute; but argument seems in favour of the view, that the veins take up and carry to the several organs of excretion those particles of which it is desirable at once to get rid, and the absorbents return once more to the circulation such as are fitted again to play a part in the nutritive process.

The first product of the decay of all organised substances is carbonic acid, and this is the one which is most constantly and rapidly accumulating in the system, and the retention of which, therefore, within the system, is the most injurious.

Accordingly, we find two large viscera, the lungs and the liver, adapted to remove it, and to both of these venous blood passes before it is again sent through the system. Now, as I explained to you, it is only in the capillaries that the various processes take place, it is evident that this venous blood must be poured into a network of these, both in the lungs and in the liver, before the carbon can be separated, and to this alone is

owing that peculiar arrangement of the portal vein, by which the trunk, after having like other veins been formed by radicles, is, like an artery, again distributed into branches. In the lungs the same effect is produced without such re-division of the vessel returning the venous blood from the body, because in them there is a special heart which receives it, and transmits it to the capillaries of the excretory organ by an artery given solely for the purpose. Were the *venæ cavæ* and the pulmonary artery continuous, without the intervention of the pulmonic heart, they would form together a vessel precisely analogous (in this point) to the *vena portæ*.

The office both of the lungs and of the liver is, as I have said, to eliminate carbon from the blood, and in both of them this action is rendered subservient to another end. In the lungs, that end is the introduction of oxygen into the system—in the liver it is the formation of a secretion, which plays an important part in the chemistry of digestion, viz., bile—for the carbon which is here separated is so separated, not singly and in the form of carbon, but with a small portion of O, H, and N, and with certain salts, the whole together forming the biliary secretion.

From the foregoing account of the portal vessel, you will see that there is some difficulty in knowing among what class of vessels to place it. It was probably first named a vein from its carrying dark blood, and long habit has reconciled us to the term, but now when this character is no longer recognized as the basis of classification, it appears doubtful whether the arterial system has not at least an equal claim to it ; for if it resemble a vein in the delicacy of its coats, in returning blood towards the heart, and in commencing by radicles, it equally resembles an artery in being entirely destitute of valves, in carrying blood to an organ for secretion, and in terminating by division into branches.

The only other arrangement in the venous system which it is necessary to mention as exceptional, is that of the sinuses of the brain. These sinuses or channels are formed by the splitting and subsequent re-union of the layers of one of the membranes covering the organ, and called the *dura mater*. This membrane is very tough and dense, and where the fissures exist which separate the several portions of the brain, it sends into each of such fissures a prolongation to support the neighbouring structures from pressure on each other, and to prevent disturbance by motion. The prolongations are formed thus : where the membrane passes over the fissure it becomes separated into two layers, the outer continues its course to surround and envelope the whole viscus, the inner is split in a line corresponding to the fissure, each edge of the portion split being prolonged downwards into it, and ending at the bottom, either by becoming continuous with its fellow, or, if that fissure join another, with the membraneous process lining it.

Between the point where the membrane first splits, and that which the two layers again come into apposition, a channel is left, and such channels, which are for the most part triangular, form the cerebral sinuses.

These sinuses fulfil the office of the trunk veins. They are, in addition to the firm fibrous *dura mater* forming them, lined by a continuation of the delicate internal coat of the veins. They receive the venous radicles which have collected the blood from all parts within the skull, and where, after their junction, they emerge from this bony case by the *jugular opening* at its inferior part, they pour their contents into a venous trunk.

The object in view, in superseding by them large veins within the cranium, appears to be that from the denseness of their walls there is much less fear of their becoming over-distended, and thus pressing on the nervous substance, pressure on which, to any extent, would occasion a state of insensibility.

Having thus, Gentlemen, considered the general anatomy of the human

circulation, and endeavoured to give an outline of the *structure* and *disposition* of those organs which are furnished for it, I shall now pass on to the physiology pertaining to the subject, and, in attempting a similar outline of the *function* of those same organs, seek to lay before you a sketch of the duties which the several parts of this beautiful machine have respectively to perform, and of the manner in which they effect their allotted tasks.

This part of our inquiry may be conveniently conducted under the following heads:—

1st. The forces of the circulation.

2d. The formation and composition of the blood.

The Forces of the Circulation.—The constant passage of the fluid throughout the circle appears to be kept up rather by a combination of several distinct forces, placed at different parts of its course, than by any single power limited to one structure and to one spot. It is not to be denied, that in the higher animals the *chief* cause lies in the contraction of the ventricles of the heart, but since lower in the scale of creation, circulation is effected without the agency of any analogous organ solely by the vital contractility of the vessels, and the chemical attraction of the fluid for their coats, we cannot suppose that these means are entirely laid aside in the more perfect forms, and wholly superseded by the additional organ furnished to *them*.

It is more philosophical to consider, that the power at the centre of the circulation which is placed in the heart, and that at its periphery which resides in the vessels, are antagonistic, or rather compensatory, in the amount of their respective development; that is to say, that they are developed in an inverse ratio to each other. In this case we must conclude, that where the heart is absent, the power of contraction in the vessels being largely supplied constitutes an influence sufficient alone to effect the task;—that where the heart exists, but possesses, as in fishes, walls comparatively thin and weak, the vessels, though not the only, are still the principal agents;—and, lastly, that as that organ increases in solidity and strength, it gradually takes on the chief of the exertion, and the contractility of the vessels sinks into a mere subsidiary assistance. The view, that the vessels have still a degree of power even in man, derives great support from the fact, that under certain circumstances, as in local inflammation, the force of circulation sometimes becomes altered at some one part without that of the rest of the system being correspondingly affected to any appreciable extent. Thus, in a case of active inflammation of the thumb, the radial artery, which supplies this part of the hand, is found pulsating (at the wrist) more fully and forcibly on that side of the body than on the other; whereas, did the only power reside at the heart, it is evident that no increase of force could be supplied to one vessel without equally affecting all the rest.

We may, therefore, in considering the forces of the circulation, take them *seriatim*, according to the structures in which they reside; and, first, concerning that of the heart.

The force of the ventricular contraction, though admitted by all writers to be the chief agent, has been very variously estimated as to its amount; in fact, so contradictory do their several statements appear, as to have been, not undeservedly, the subject of much ridicule. This power was made a matter of particular consideration by those physiologists, who, soon after Harvey's time, sought to follow up his views of the mechanism of the circulation. Adopting the opinion which he had taught, that the heart was the sole agent in propelling the blood, it became interesting to ascertain the impediments and resistance which it has to overcome. With this view they examined the angles formed by the branches at their points of origin—the number of divisions and sub-divisions which took place

down to their termination in the veins—the proportions subsisting between the calibre of the minor currents as compared with those from which they proceed, and, finally, the friction of the blood against the sides of the vessels having been taken into account, the calculations to determine the question proposed, were carried on with all the precision which mathematical formulæ could give them. From such data, one physiologist, *Borelli*, inferred the heart's force to be equal to 150,000 lbs., whilst another, *Keill*, reduced it to five ounces.

The later researches of Hales and Poisseuille, who grounded their opinions on the weight of the column of blood or of mercury which they found it capable of sustaining in a tube, bring it nearly to thirteen pounds, about two-thirds of which are spent in overcoming the inertia and backward pressure, the other one-third representing the force of the current in the aorta.

The frequency with which the impulsion is given, or in other words the number of contractions of the heart in a specified time, is liable to great variation, even within the limits of ordinary health, from several causes, the chief of which are *age*, *sex*, *position*, *muscular exertion*, *state of the mind*, *condition of the digestive system*, and *period of the day*. From the time of birth to that of death, the pulse is (*cæteris paribus*) every year becoming slower, so that while in the newly-born infant it ranges from 130 to 140 per minute, in old age we find it between 50 and 60. A moment's consideration of these figures will show the perfection and completeness of the heart, and how beautifully fitted it must be for its office, since, taking the mean number of seventy per minute, we find it acting more than 100,000 times every twenty-four hours, and yet continuing night and day untired and unexhausted, often not even deranged, during perhaps the long period of seventy or eighty years. In women it is quicker than in men, especially in adult age, the average difference at the same mean age being ten to fourteen beats per minute. In both it is increased by mental emotion, by muscular exertion, and during digestion. In both it is most frequent in the morning, and diminishes in number as the day advances, and lastly, in both it is more rapid standing than when sitting, and sitting than when lying.

The several movements which together make up the action of the heart, do not (as before mentioned) take place simultaneonsly, neither is their succession to each other perfectly continuous. The ventricles having contracted, immediately expand again to a partial extent, probably by the elastic tissue interwoven with their muscular fibres recovering from the pressure of the contraction; this constitutes the first stage of the ventricular diastole or dilatation. The second stage is formed by the auricular contraction forcing blood into their cavities, and so swelling them out.

Now it is between these two stages of the ventricular dilatation that the brief interval of repose recognised on attentively listening to the heart, is said to take place. The order of events will therefore be thus:

Auricles.		*Ventricles.*
Contraction.....	Simultaneous with.....	Second stage of dilatation
Dilatation	" "	Contraction and wave of pulse
		First stage of dilatation
	Brief interval of repose.	
Contraction.....	Simultaneous with.....	Second stage of dilatation
Dilatation	" "	Contraction and wave, &c.

And so on, beginning again. The interval of repose is calculated at about one-fifth the duration of the whole.

The quantity of blood propelled by each ventricle at every stroke is about two ounces, or rather less, which gives from seven to eight pounds

per minute. Consequently the whole of the blood in the body, which is estimated at from twenty-eight to thirty pounds in persons of average weight, will pass through the cavities of the heart every four minutes.

We have next to consider the influence of the *arterial tubes* on the flow of blood through them, which influence is exerted by the middle or fibrous coat alone. On this subject you will find in various works rather contradictory statements, which result from the confusing together of two properties possessed by this fibrous coat which are in reality totally and entirely distinct.

The first is *Elasticity*, or the power when dilated of returning to its original size on the removal of the dilating force. This is simply a physical property such as would equally reside in a tube of caoutchouc, or any other elastic substance, and which in the arteries persists after death until their structure becomes disorganized by chemical decomposition.

The second is *Contractibility*, or the power of actively contracting on the application of any stimulus so long as their vitality remains. This is a true vital endowment, ceasing on the death of the part.

The outer surface of the fibrous coat is made up of a layer of yellow elastic tissue, and in this the *first* property is placed. The inner surface is formed of a more delicate set of fibres disposed in rings, and in this resides the *second* action.

Now these two structures have different functions to perform. The simple *elasticity* of the outer layer can obviously do nothing towards *increasing* the force of the blood, but it nevertheless plays an equally important part — it converts the intermitting impulses which the fluid receives from the heart into a continuous current. If, with a powerful force-pump, we inject water by successive strokes into a series of pipes with unyielding walls, the egress of the fluid at the farther extremities of these pipes will be as much interrupted as its entrance into them ; but if, instead of unyielding tubes, we attach elastic ones as of India-rubber, the stream, if they be long enough, will be continuous, for a portion of the force of each stroke will be spent in dilating the tubes, and when the dilating power is taken off, as it of course will be in the interval between the strokes, the dilated tubes in returning to their original size by virtue of their elasticity, will keep up the expulsion of the stream of fluid until (provided the interval be not too long) the impulse be renewed. This is precisely the case with the stroke of the heart telling against the fibrous coat of the arteries.

But arteries not only *equalize* the heart's power, they also *augment* it : this depends on the *contractility* of the inner layer. It has been ascertained that, when dilated by blood injected into them, they re-act with a force superior to the impressing impulse, and the amount of this superiority will of course be the amount of the active contractile power.

These two forces exist in different proportions at different parts of the arterial system. The physical elasticity is most developed in the large trunks near the centre of circulation, because it is there the intermitting impulse is most felt and most requires to be equalized. The vital contractility is greatest in the small branches of remoter parts, because it is there that the heart's force is least felt, and so requires the greatest assistance.

Both of these powers assist in keeping the arteries always full, whatever amount of blood they contain, by adapting the size of the tubes to the supply of their contents.

The next set of vessels are the capillaries. The existence of any independent power in these has been often denied, and so far as elasticity and contractility are concerned, the denial appears well founded, for, though their coats have been proved to be contractile, nothing like the periodical

dilatation found in the arteries under the impulse of the heart has ever been demonstrated in them ; and contraction exerted *continuously* must of course impede rather than assist the current of fluid. We must consequently consider the fibrous coat, which has been proved to exist in these vessels, as having for its office only the regulation of their calibre. The recent researches, however, of Professor Draper tend to prove that both in animals and vegetables there is a force of circulation exerting in the capillaries which is neither physical nor vital, but purely chemical. The following is a quotation from his work "*On the Forces which produce the Organization of Plants*," which will explain the views he has put forth ; and, though, he only applies them to the vegetable world, they are equally adapted to elucidate the phenomena of animal circulation, and as such have received the sanction of some of our latest writers on Physiology.

"It is capable," says Professor Draper, "of being shewn by experiments on inorganic bodies, that if two liquids communicate with each other through a capillary tube, for the walls of which they both have an affinity, and if this affinity is stronger in the one liquid than in the other, a movement will ensue ; the liquid which has the greatest affinity being absorbed most energetically into the tube, and driving the other before it. The same result occurs when the fluid is drawn, not into a single tube, but into a net-work of tubes permeating a solid structure ; for if this porous structure be previously saturated with the fluid, for which it has the less degree of attraction, this will be driven out and replaced by that for which it has the greater affinity, when the latter is permitted to enter it. Now if, in its passage through the porous solid, the liquid undergoes such a change that its affinity be diminished, it is obvious that, according to the principle just explained, it must be driven out by a fresh supply of the original liquid ; and thus a continual movement in the same direction would be produced.

"Now this is precisely that which seems to take place in the organized tissue, permeated by nutritious fluid. The particles of this fluid, and the solid matter through which it is distributed, have a certain affinity for each other, which is exercised in the nutritive changes to which the fluid becomes subservient during the course of its circulation. Certain matters are drawn from it, in one part, for the support and increase of the woody tissue ; in another part, the secreting cells demand the materials which are requisite for their growth, as starch, oil, resin. &c. ; and thus, in every portion that is traversed by the vessels, there are certain affinities between the solids and the fluids, which are continually being newly developed by acts of growth, as fast as those which, previously existed, are satisfied or neutralized by the changes that have already occurred. Thus, in the circulation of the elaborated sap, there is a constant attraction of its particles towards the walls of the vessels, and a continual series of changes produced in the fluid as the result of that attraction.

"The fluid which has given up to a certain tissue some of its materials no longer has the same attraction for that tissue, and it is consequently driven from it by the superior attraction then possessed by the tissue for another portion of the fluid, which is ready to undergo the same changes, to be in its turn rejected for a fresh supply. Thus, in a growing part there is a constantly renewed attraction for the nutritive fluid, which has not yet traversed it ; whilst, on the other hand, there is a diminished attraction for the fluid, which has yielded up the nutritive materials required by the tissues of the part ; and thus the former is continually driving the latter before it."

Such is the very beautiful theory of this author : its application to the animal economy as an assistant power to that of the heart and arteries is evident and simple. The walls of the capillary vessels in which the nutri-

tive process is continually going on, have an attraction for the arterial blood which enters them laden with the oxygen and the nutrition they need ; but so soon as they have abstracted from any portion of it these principles, their affinity for such portion ceases, and is transferred to the blood immediately behind, which still contains them, and which is thus drawn forward, pressing the other before it, to be in its turn rejected for a fresh supply.

The forces of circulation in the veins need not detain us long, for they are comparatively unimportant.

The movement of the blood through these vessels is without doubt chiefly effected by the *vis à tergo*, or propulsive force, which results from the action of the heart and arteries, and from the additional power generated in the capillary network. This is shown by the immediate arrestment which takes place when these forces are suspended. There are, however, some concurrent causes. One of these, the suction-power attributed to the heart from the auricles dilating actively, and so drawing the blood into their cavities out of the venous trunks, has been much insisted on by some, but it is doubtful whether after all, this dilatation be much more than passive, or resulting from blood pouring into them ; at any rate it has never been shown to possess much influence on the circulation.

Again, the effort of inspiration, by causing a vacuum in the chest, has been supposed to much assist the return of the blood towards it, on the same principle as the dilatation of the auricles. This influence seems, however, to be confined to the large trunks entering the chest, and not to extend to the general system. It is obvious that it can, at any rate, have no effect on the pulmonic circulation, since that is altogether within the cavity of the chest.

Lastly, we must notice an agency far more powerfully affecting venous circulation, especially in the limbs, than either of the preceding ; viz., *muscular movement.* It is the law of muscular contraction, that the muscle shall, during it, increase in thickness in proportion as it decreases in length, consequently every time any muscle is brought into action, it will compress the veins of its neighbourhood, and since, by reason of their valves, the pressure cannot force their contents back into the small vessels, it must necessarily drive them on toward the heart. In this way, even the slightest motion of the body is made to assist the current of the blood.

The flow of blood is much slower in the veins than in the arteries ; this is consequent on their greater aggregate capacity (which is fully double that of the arterial system) for liquids flowing from a narrower into a wider channel, always lessen in speed.

These then are the several agencies which assist in keeping up the constant progress of the nutritive fluid : in the *heart* we have the ventricular contraction ; in the *arteries* the elasticity which equalizes, and the contractility which augments this force ; in the *capillaries* the chemical affinity of the fluid for their coats ; and finally, in the *veins* through the aid of their valves, the pressure of muscular contraction when the body is moved.

We now arrive at the examination of the nutritive fluid itself.

In considering the subject of *the blood*, the most natural commencement would be an account of the digestive process, since this forms the first link in that chain of actions by which the circulating fluid is produced and enabled to support the life of every structure. But, unfortunately, time will not allow my going into detail on all the many branches of inquiry which suggest themselves in so comprehensive a theme as the circulation of the blood. I therefore think it better to dismiss the subject of digestion with only a few very general observations, inasmuch as the opportunity will shortly occur to you of becoming acquainted with this process from

the lips of another lecturer, who in discoursing specially on it, will explain the matter far more fully than I could attempt to do now. The following remarks are, consequently, only intended as a mere skeleton outline.

The organized tissues of the body are replenished by the food ; it is necessary for this that the food should be acted on in such a way, as to separate the soluble and nutritive principles from the insoluble and inert ingredients. Digestion has for its purpose this action ; the food is first masticated or broken up into a convenient form by the teeth—it is at the same time insalivated or mixed with saliva, which contains, mechanically disseminated through it, a large quantity of atmospheric air—it is then swallowed. In the stomach, the solvent liquid or gastric juice, which is rapidly poured out on the entry of the food, converts it, by the action of a peculiar principle, *pepsin*, into a grey, semifluid, pultaceous mass. This is called "*chyme*," and the process "*chymification*." The chyme then passes out of the stomach at its opposite end, and enters the beginning of the intestines ; here it meets with two other secretions, the most important of which is the bile, coming, as I mentioned, from the liver, and the bile and the chyme act chemically on each other. That the action is simply chemical is proved by precisely the same effect taking place when these two substances are mixed out of the body. The bile precipitates all the extraneous and non-nutritive matters, while the nourishing particles float as a milky fluid on the surface. This milky solution is named "*chyle*," and the action forming it "*chylification*." It contains the concentrated essence of the chyme freed from all impurities. The extraneous or feculent matter passes on to be rejected ; the chyle passes also with it, not mixed up in the mass, but disposed as a superficial stratum surrounding its outer surface, so as to be applied, during its course, in the greatest extent possible, to the coats of the intestines. The reason of this will presently be seen.

Having thus slightly indicated the conversion of food into chyle, which is the basis of blood, we must next touch on the mode in which it is absorbed from the cavity of the intestine, and carried to the circulating organs ; and it is in speaking of this that I proposed briefly to describe those *absorbent vessels* to which I referred at our last meeting.

The absorbents may be likened to a system of small veins pervading the entire body, and carrying a colourless fluid. Though smaller than the latter vessels, they are more numerous ; like them they commence from radicles, whose convergence forms their trunks, and they are also as freely supplied with valves. From the different nature of their contents at different parts, they are divided into two classes :—

1st. *Lymphatics*, which are found throughout the general system. *Their* office appears to be the carrying back into the circulation such particles, set free in the decomposition of the tissues, as are fitted again to be applied to use. Their contents are called *lymph*.

2d. *Lacteals*, which exist only in the abdomen, their radicles commencing in the membraneous lining of the intestine. *Their* function is to absorb the chyle which we found floating outside the excrementitious matter, and so applied freely to the intestinal walls. In the intervals of digestion they are filled like the others with lymph.

Both sets, at the termination of their course, pour their contents into the veins ; hence they are, as I told you, tributaries to the venous system. Those of the two sides of the lower part of the body, and of the left half of the upper part, empty themselves into the *thoracic duct*, which is simply the largest absorbent in the system, and which runs up through the chest, lying on the spine ; while those of the right half of the upper part form a smaller trunk of their own. The thoracic duct is in diameter about the size of a goose-quill. These two canals open into the venous system on

their respective sides, at the point where the veins of the neck and those of the arm form, by their junction, a common trunk : the opening in both is furnished with a pair of semilunar valves.

In the lower grades of the animal world no separate absorbent spstem exists, the veins, as I explained to you in the star-fish, performing their duties.

The lymphatics and lactcals in their course pass through sevcral glands, which are called *absorbent glands*, and which are formed by convolutions of the absorbents themselves interlaced with capillary blood vessels. The offices of these glands is to effect certain changes in the chyle and lymph, which shall fit them more fully for their nutritive duties. Accordingly, on examining the composition of chyle, we find that, in proportion as it passcs through these glandular bodies, it becomes more and more in its nature analogous to blood ; so that, by the time it arrives at the thoracic duct, its principal differcnce from that fluid is the absence of the red particles. This gradual change of chyle towards the composition of true blood is called " *Sanguification.*" Thus the conversion of food into blood consists essentially of three processes—*chymification*, in the stomach ; *chylification*, in the upper part of the intestines ; and *sanguification*, principally in the absorbent glands of the lacteals. I say " principally " because, as the term " sanguification" is literally the " turning into blood," we cannot consider it complete until the red particles are also added, which does not take place until after the chyle has entered the blood-vessels.

The question here naturally arises, " In what does the change effected in these absorbent vessels and glands consist ?" and it will be best answered in considering the difference bctween chyle and blood.

Chyle, when first formed, is an opalescent, milky fluid, consisting of albumen and a small portion of saline matter, both in solution, and a number of minute *fat* or *oil* globules (to which its milkiness is owing) in suspension.

All of these are substances which existed in the food, and have been extracted from it.

Now, as you are probably aware, living animal structure always contains a portion of the element nitrogen, and as the albumen of the chyle is the only nitrogenizcd matter derived from the food, we must view it as the basis from which the organized tissues are generated : albumen is, in truth, the *raw material* from which the body is manufactured.

But albumen, whilst it remains such, is inorganizable, that is, incapable of being endowed with vitality, or becoming part of a living structure ; it must be first changed into another principle, *fibrine*, which, although not very different from it in chemical composition, is widely removed in its vital properties. This fibrine constitutes a large proportion of the living solid, and is the principle existing in the blood which is used in the repair and nutrition of the several parts. It is possessed of the property of spontaneously coagulating into a firm tough mass, and of then becoming organized as a part of the structure in which it is effused. For cxample : if you were to cut a piece out of your finger, the first step towards reparation would be the effusion from the severed capillaries of fibrine in a fluid state ; this would then coagulate and become converted into flesh ; vessels would grow into it by extension, and circulate through it the blood, and when they reached its surface they would again effuse more fibrine, which would coagulate as before ; and so on till the mischief was repaired. Now albumen has no such power of spontaneous organization : it is coagulable by a high temperature (higher than we ever get in the body), and also by certain chemical re-agents, but not without ; therefore it must be changed into fibrine before it can be used in the nutritive process. This change is just what the glands of the lacteals effect ; for on exa-

mining chyle after it has passed them we find it will coagulate of its own accord at common temperatures, showing the presence of fibrine, while in proportion as that has become developed, albumen is deficient.*

Besides the albumen and fibrine in solution, and the fatty matter in suspension, the chyle, as it passes on towards the thoracic duct, becomes more and more charged with a number of minute bodies floating in it, and called chyle globules ; they appear to be cells which have the power of self-generation by throwing off germs which become similar cells, and grow from absorption of the surrounding nutrient fluid. They are now generally admitted to be identical with the colourless corpuscles of the blood, and will be considered under the head of *blood*, to which I now come.

The blood whilst circulating in the living vessels, may be seen to consist of a transparent nearly colourless liquid, termed *liquor sanguinis*, in which the red corpuscles from which the blood of the higher animals derives its peculiar hue, as well as the *white* or *colourless corpuscles*, are freely suspended and carried along by the current. On the other hand, when the blood has been drawn from the body, and is allowed to remain at rest, coagulation takes place, separating it into crassamentum and serum. The crassamentum or clot, is composed of a network of fibrine, in the meshes of which the corpuscles, both red and colourless, are involved together with a certain amount of serous fluid. The *serum*, which is the same with the liquor sanguinis deprived of its fibrine, coagulates by heat, and is therefore known to contain albumen ; and if it be exposed to a high temperature, sufficient to decompose the animal matter, a considerable amount of alkaline and earthy salts remains. Thus we have four principal components in the blood : *fibrine*, *albumen*, *corpuscles*, and *saline matter*.

In the *circulating* blood they are thus combined—

Fibrine.....	In solution forming liquor sanguinis.
Albumen ...	
Salts.....	
Corpuscles	Suspended in liquor sanguinis.

But in *coagulated* blood they are combined as follows :—

Fibrine.....	Crassamentum or clot.
Corpuscles	
Albumen ...	Remaining in solution, forming serum.
Salts.....	

What then are the several uses of these constituents ? The vital properties of the blood are most immediately dependent on the *fibrine*, since that is the material most completely prepared for organization. It is, therefore, continually being withdrawn from the blood by the nutritive operations, and the demand appears to be supplied in part by the influx of fibrine which has been prepared in the absorbent system, and in part by the continued transformation of albumen which takes place during the circulation of the blood.

It has been lately advanced that this transformation, whether in the absorbent or sanguiferous vessels, is effected by the agency of the colourless corpuscles, and the view is supported by strong arguments. Certain it is, that wherever they are present, fibrine is in process of formation, and certain also that they *are* present in the circulating fluid of all animals, whether warm or cold-blooded, which latter fact undoubtedly points to the conclusion that their function is in some way directly connected with *nutrition*.

The *red* corpuscles, on the contrary, are only found (to any extent) in

* To use a homely illustration, albumen, fibrine, and organized structure bear the same relations to each other as the *raw cotton*, the *spun yarn*, and the *woven fabric*.

the higher animals, and bear a pretty constant relation to the activity, not of growth, but of *respiration*. *Their* special function appears to be to absorb oxygen in the lungs, and to carry it to the various structures, in the capillaries of which, the heat of the body is kept up by a process of slow combustion, resulting from its combination with carbon and hydrogen, furnished partly by the non-azotized principles of the food, partly by the decomposing tissues.

These red corpuscles are remarkable for containing a small portion of iron (found nowhere else throughout the body) in combination with their colouring matter, which is called *hæmatine* or *hæmatosine*, and on this, in conjunction with other facts, Liebig has raised his ingenious theory of respiration.

He says, that the iron in arterial blood is in the state of sesquinoxide, but that in the capillaries it gives up the half atom of oxygen which combines with the carbon and hydrogen set free by the changes going on there, forming water and carbonic acid—that the latter, uniting with the protoxide of iron which remained, becomes a proto-carbonate, which he asserts is the form of ferruginous salt, found in the venous blood; and lastly, that this proto-carbonate, when brought into contact with air in the lungs, gives up its carbonic acid, which is expired, and, absorbing oxygen, is again converted into sesquinoxide to circulate as before.

The *saline ingredients* of the liquor sanguinis are evidently intended to supply the mineral materials so largely required for the generation of some of the structures, particularly *bone*, and for the production of the various secretions.

There is one more topic to be spoken of in connection with the blood—the appearance, under the microscope, of the corpuscles, both red and colourless. They have been generally termed, blood "*globules*," but it is a very erroneous term. They are not spherical, but have the form of flattened discs, like pieces of money, only thicker. They have colourless nuclei or central points, and external membraneous walls, the spaces between the two being filled with fluid, which in the red contains the colouring principle (hæmatosine) combined with the iron. They appear to be developed entirely from each other, each corpuscle or cell throwing off, as I explained, germs which become other cells. They are of smaller size in the mammalia than in any other class, their discs, in these and in fishes, being circular, while in birds and in reptiles they are oval. Finally, their diameter in the human body is about $\frac{1}{5000}$ of an inch.

And now, in concluding my subject, I feel I owe to you an apology for leaving it in so incomplete a state. I had intended, and should have wished, to touch on several points I am compelled to relinquish—to give a more perfect account of the blood in health, and an outline of the various changes effected on it by disease; and likewise to speak more at large on the manner in which the several structures are built up from it, and the various secretions elaborated. But these lectures have so extended under preparation, that I have found myself obliged to pass by unnoticed much that I would have included.

I can only refer those who are inclined to pursue the inquiry to the published works that treat on its several parts, especially to Professor Rymer Jones's *Animal Kingdom*, Dr. Quain's *Anatomy*, and above all, to the admirable *Treatise on Human Physiology*, from the pen of our distinguished late fellow-townsman, Dr. W. B. Carpenter. From all these I have myself largely drawn, my only object being to give you, in a connected whole, the descriptions and conclusions of the latest and best observers, stripped so far as possible of their technical phraseology, and clothed in the more homely garb of ordinary English.

ACETIC EXTRACT OF COLCHICUM.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In reply to Mr. Taylor's observations on my paper concerning the Acetic Extract of Colchicum I would say that a lengthened discussion did take place when it was read, but no one raised the point he has nor do I think it tenable according to the received method of interpreting the instructions of the present Pharmacopœia, which, in many instances are conveyed in very loose terms. In the present instance no allusion is made to the straining of the juice, but in the very following extract, "Extractum Colchici Cormi," the text says, "Contunde in mortario lapideo, insperso exiguo aquæ; dein exprime succum, eumque *non defæcatum* ad idoneum crassitudinem consume." Now there is every reason to believe that as these extracts are both prepared from the same cormus, the same process was intended to be applied to the preparation of each extract; but that, by some oversight (the extracts of aconitum, belladonna, colchicum, conium, digitalis, hyoscyamus and lactuca, being classed together in the original text) the specific instruction "*non defæcatum*" was omitted in the acetic formula.

I think if we admitted Mr. Taylor's view of the subject to be the correct one, we might equally insist that the green colouring matter (chlorophylle) mechanically suspended in the expressed juices of conium, hyoscyamus, &c, ought to be allowed to settle previously to proceeding to evaporation.*

There is no doubt that the establishment of the Pharmaceutical Society and the discussions which take place at its monthly meetings, will lead eventually to a more uniform manufacture of the preparations of the Pharmacopœia in consequence of the attention which must inevitably be drawn to the subject by the authorities of the College, and this must certainly lead them in their future editions to make use of less ambiguous terms and give more precise instructions than they have hitherto done. There is one suggestion which I made when my paper was read, and which if adopted by them, would I believe tend more to this result than anything else they could do. It is this, that they should append to their instructions for the preparation of each article *an average product,* such product to be obtained from the results of a series of operations at Apothecaries' Hall or other trustworthy establishment; and in addition, in the case of fresh vegetables, if they would specify at what period of the year the plant was to be used. In the case under consideration if an average product had been named, we could at once have decided whether the starch was intended to be included or not in the finished extract.

I may observe that if any alteration is made in the next edition of the P. L., I hope it will be in accordance with what I have advanced in my former article, as if an extract is ordered to be prepared according to Mr. Taylor's suggestion, it is an unmanageable compound, attracting moisture and becoming rapidly thin in the same manner as Garden's, and almost invariably requiring the ad-

* *Vide* vol. i. p. 133, at bottom and over.—*Scanlan.*

mixture of starch or licorice powder when dispensed; and therefore it would be far preferable at once to make a stiff and permanent extract, such as that which is deposited in the Museum prepared by the process I have proposed.

I am, Sir, yours respectfully,

JOHN FORDRED.

Church Street, Hackney, Jan. 21, 1848.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—It is, I believe, allowed to all who attend the Pharmaceutical Meetings to put questions and offer remarks on papers read on those occasions. Presuming that when the papers are published the same liberty is reserved to those who are, by any circumstances, prevented attending, I would ask Mr. Fordred, whose paper "On the Preparation of Acetic Extract of Colchicum," appears in the present number of your interesting and useful journal, on what authority he repudiates the assertion of "some who have said that the clear liquid alone should be evaporated?"—not that I have said any thing on the subject, nor was aware any one had publicly asserted the fact, but because I have, under the supposition that the Pharmacopœia so meant, hitherto adopted the practice. In the formula for this particular extract, I admit it is not expressly stated whether the starch is, or is not, to be used; but considering that the starch is not necessarily a part of the juice, and comparing this formula with those laid down for the preparation of other fresh vegetable extracts, I conceive the evidence adduced is decidedly against Mr. Fordred; for instance, in the direction given for the preparation of Ext. Aconiti, we have the following:—"Dein exprime succum, eumque, *non defæcatum*, ad idoneum crassitudinem consume;" then follows a list of analogous preparations, including *Ext. Colchici cormi*, closing with "Eodem preparentur quo Extractum Aconiti;" but when we come to the directions for making *Ext. Colchici aceticum* the words "*non defæcatum*" are omitted. So, if we turn to Phillips's translation, where all the formulæ are given at length, in that for the acetic extract it is said "evaporate it," and in that for the simple extract, "evaporate it unstrained." Again, it appears to me that the opinion Mr. Fordred impugns is strengthened by the fact which he has stated, that Mr. Garden was the first person who prepared this extract under the superintendence of Sir Charles Scudamore, by evaporating the acetum colchici; for if the College were led by this (which I think more than possible), their intention was probably to produce a similar preparation, by a process which requires less exposure of the juice to the heat.

There is another part of Mr. Fordred's paper that I would be allowed to make a few remarks on, viz., where he speaks of the acetic acid.

The Pharmacopœia directs a given quantity of *acetic acid* to be used. Now, the acetic acid recognised by the Pharmacopœia is of the specific gravity 1.048, and 100 grains are required to saturate 87 grains of chrystals of carbonate of soda. (See Notes *Ph. Lond.*, 1836.)

If Mr. Fordred will inform me where such acetic acid as is here indicated can be procured at 7*d.* or 8*d.* per pound, he will be conferring

on me a great favour, as I have hitherto used such as I procure from Messrs. Beaufoy & Co.'s, at 2*s.* 8*d.*, for this and all other purposes where acetic acid is directed by the Pharmacopœia.

Some years since I used a weaker acid, at about 2*s.* 2*d.* per pound, but finding that this did not stand the test with soda, as prescribed, I obtained the stronger, which Messrs. Beaufoy & Co. assured me would bear all the tests of the Pharmacopœia; and I have no reason to think the contrary. This part of the subject, I conceive, is as important as the matter of starch or no starch, as it involves other preparations of the Pharmacopœia; for if the strength of acetic acid be a matter of importance here, there are several preparations which might be treated in the same way. Now, Sir, allow me to say, in conclusion, that, in what I have said, I have not the least intention of annoying Mr. Fordred, but simply (as I believe he does) desire to elicit the truth, and promote uniformity; and I beg to thank him and your other correspondents, whose time and talents allow them to write for the information of others.

I am, Mr. Editor, with many thanks to yourself and other leading Members of the Pharmaceutical Society, for the efforts you make in behalf of our trade,

Your obedient servant,

J. F. Blandford.

97, *Charlotte Street, Fitzroy Square, Dec.* 30, 1847.

THE PROBABLE ACTION OF CHLORINE AS A DISINFECTANT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Had not the paper read by Mr. Smith at our last meeting extended to so great a length, it was my wish to have put a question to the Members as to their opinion of the precise manner in which chlorine acts when it puts in check the spread of infectious miasms.

From all the authorities I have consulted on the subject, I merely gather in effect this statement, that chlorine enters into chemical union with the miasmatous substance, and changes the combination of its elements into compounds of lower organic type, or even into inorganic.

It is everywhere believed by Chemists that the matter of infection is highly organized, and though not volatile, that it may, like the pollen of flowers, remain mechanically suspended in the air. What then is the action which chlorine exerts over this subtle agent?

We are familiar with the effects of chlorine upon such compounds as phosphuretted, sulphuretted, and carburetted hydrogen, the chlorine from its superior affinity uniting with the hydrogen, and leaving the other combustibles to be either oxidized or precipitated in a simple state.

But these gases, though noxious, are not *infectious*, and as the evils in nature are to a greater or less degree self-mitigating, it is doubtful whether even these noxious gases, in the absence of better means, do not occasionally perform a service, not merely by warning us of the presence of more dangerous matter, but by spreading a gaseous mask over its influence. Surrounded by the products of fermentation of their own excretions, it is said that the inferior animals thrive

amazingly, as is observable with pigs, and is instanced by the manner of feeding oxen, called "pitting" them. The odours of a cow-shed are also said to be decidedly beneficial to the human subject in a variety of cases. I am not desirous, however, by any means, of advocating a conservatism of the impure gases, but merely wish to remark, that to deodourize the air, is not necessarily the same thing as to disinfect it.*

Chlorine can enter into union with a vast many organic bodies, modifying or completely changing their character; *e. g.* by substitution of the radical hydrogen of alcohol, or rather aldehyde, as in chloral, or when it stands in the stead of oxygen, as in the comparison of, anhydrous formic acid, C_2 H O_3, and chloroform, C_2 H Cl_3. And Mülder mentions a combination of chlorine with such a high compound as proteine, which it precipitates from its solution in the form of white flocculent, nearly insoluble particles, to which the name chloroproteic acid is given. But does chlorine enter into chemical union with those virulent substances it is said to have the power of disinfecting?

According to the most reasonable views, the matter of infection is not merely composed of highly organized atoms, but those atoms are in a transition state, in fact they are a *ferment*. Let us consider, then, what are the means by which we may modify or restrain fermentation. Among the most powerful agents for this purpose are sulphurous acid, salts of mercury, volatile, and particularly empereumatic oils, most aromatic substances, tobacco smoke, vapour of roasting coffee, and last, but not least, chlorine, iodine, and bromine, to which may be added substances that are the result of fermentation, as alcohol, and possibly sulphuretted, phosphuretted, and carburetted hydrogen (?), carbonic acid and ammonia. In the "quick vinegar process" introduced into Germany by MM. Wageman and Schuzenbach, although a large quantity of alcohol may be wholly transformed into vinegar in less than thirty hours, the merest trace of wood-vinegar present during the fermentation, would entirely put a stop to the process. The complete immunity also from contagion enjoyed by several trades during the great plague of London, such as tobacconists, curriers, tallow chandlers, oilmen, and other oily or greasy businesses, is a well-known proof that many substances as well as chlorine have a very high power of resisting the action of infectious matter, or, in other words, of stopping its fermentation.

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* Water, air, and light, in free abundance, are the only materials upon which we may well rely for this great purpose. Though somewhat foreign to the present communication, it may be asked, can the new Commissioners of Sewers be expected to make any very great sanitary amendment with the present most limited supply of water? I quote from a small but respectable periodical, the *Topic*, No. 29, that although the daily supply of water to the metropolis is equal to the contents of a lake fifty acres in extent, and of a mean depth of three feet, there are upwards of 70,000 houses in London without any supply of water whatever. It is further stated, that by adopting, as at Nottingham, a constant high pressure, in place of an expensive, intermittent, low pressure supply, every house, and even every attic in London, might be supplied with abundance of pure water at a very moderate cost; say at the rate of eighty gallons of water for a farthing! How long then will the public continue to uphold the stagnant water monopolies?

From all this it appears most probable that the action of chlorine is twofold; first, decomposing the noxious (not infectious) compounds of hydrogen; and, secondly (the most important) suspending the fermentative ("catalytic") power of the organized, but perhaps inodorous material that produces infection. If this notion be correct, it would follow that any of the above-named substances would have their advantages as well as chlorine in the work of disinfection. For instance, camphor has long been supposed to have a charm of this sort about it, and probably the incense employed by the Jewish Church, according to their law, and described by Cruden as a very rich perfume, had reference to sanitary as well as devotional intentions. The use of strong aromatic perfumes was always general in countries much exposed to infectious influence, as we read in the inspired poetry of David, "All thy garments smell of myrrh, aloes, and cassia;" and the practice of embalming the dead (as the etymology of the word imports) had much to do with balsamic and other odorous substances. I mention perfumes more particularly than the other "anticatalytic" agents, because, as a chlorine generator could not very conveniently be carried about the person, perfumes offer an agreeable, and, I suspect, in many cases an equally efficacious antidote with chlorine against the influences of infection.

I remain, Sir, your obedient servant,

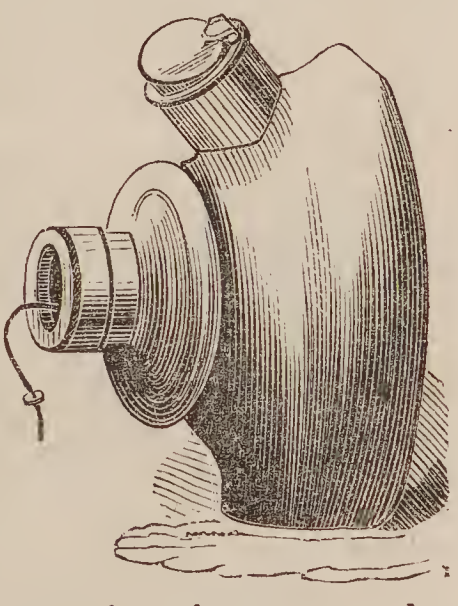
WILLIAM GALLARD.

43, *Upper Albany Street, Jan.* 15, 1848.

CHLOROFORM INHALER.

BY FRANCIS SIBSON, ESQ.,

Resident Surgeon at the General Hospital, near Nottingham.



THIS inhaler is made of copper, brass, or white metal. It has a border or mouth-piece of thin flexible lead lined with oiled silk, covering the nose and mouth, and from its ductility easily adapted to any face. The lower, or inspiring valve, as seen in the cut, is constructed on the principle of Arnott's Ventilators, having a counterpoise weight which keeps it shut, unless acted on by pressure from without. The upper, or expiring valve, is a plain metallic lid always closed unless acted on by pressure from within. The tube to which this valve is attached may be drawn out so as to expose an aperture for the admission of air when desired. If needful artificial respiration may be performed by removing the upper valve and blowing into the mouth-piece, at the same time compressing the larynx backwards to prevent the air from entering the stomach.

Mr. Sibson's mouth-piece, or, as he terms it, *oro-nasal mask*, is described in the *Lancet* for May 22, 1847, page 546, by Dr. Snow, who adapts it to his inhaler, giving Mr. Sibson credit for the contrivance.

THE CHLOROFORM INHALER

OF MR. J. E. MADDOX, OF 19, UNIVERSITY STREET, UNIVERSITY COLLEGE.

In our last number, this instrument was attributed to Mr. Coxeter, in consequence of the following circumstance. To prevent the possibility of a mistake in the name, we sent for the card of the inventor. By accident, application was made in an opposition shop, where a similar inhaler was produced, and on the inquiry being made whether that was the instrument exhibited at the Pharmaceutical Meeting, the answer was, "Oh, yes; there is no doubt that it was this instrument."

We have been informed, subsequently, that this was a mistake, Mr. Maddox being the originator of the instrument, the other party having made a similar one afterwards. In justice to Mr. Maddox, we give this explanation, with an apology for the mistake.

ON THE DETECTION OF ADULTERATIONS IN FLOUR AND BREAD.

BY M. MARESKA.

The adulteration of alimentary substances, including flour and bread, is a fraud of recent introduction, or at least it was not formerly practised on such a scale as to attract attention, for it was only in 1829 that the law first took cognizance of it. It was the admixture of sulphate of copper with bread, and the addition of chalk to flour, so commonly practised at that time, that led to the interference of the legislature. Thanks to the severity, and the active and long-continued *surveillance* which were adopted, the sophistication of bread with sulphate of copper has become very rare, if it may not even be considered to have ceased, at least in our locality. The high price of provisions appears to have again excited the cupidity of some persons, as proceedings have been taken against dealers for the adulteration of several species of flour with chalk. I have, myself, been enabled to prove the presence of chalk in bread, and the addition of from four to eight per cent. of this substance to the flour of rye and barley, and from twelve to thirty-six per cent. to those flours intended for the nourishment of animals.

Having been engaged lately in performing numerous analyses on this subject, I have necessarily selected among the known methods, and directed my attention to the discovery of new ones, and I have thought that it might be useful to make known the result of my experience.

The methods of detecting sulphate of copper in bread, and chalk in bread or flour, are so easy and well known, as not to require much notice. Bread and flour containing chalk, effervesce with the addition of dilute hydrochloric acid, although not very perceptible, unless the adulteration exceeds one and a half per cent. The liquor, filtered after the cessation of effervescence, gives a white precipitate on the addition of oxalate of ammonia, and answers to all the other indications of the presence of a calcareous salt. Pure flour and bread treated in a similar manner does not effervesce, and yields a solution which is not rendered turbid, or but slightly so, by the addition of oxalate of ammonia. For estimating the quantity of lime present, it is necessary to calcine the precipitated oxalate of lime, to re-dissolve the residue in pure diluted hydrochloric acid, and again to precipitate with oxalate of ammonia. The bread made with flour containing four per cent. of chalk, when cut, presents on the cut surface white points, which result from the agglomeration of small quantities of the carbonate of lime.

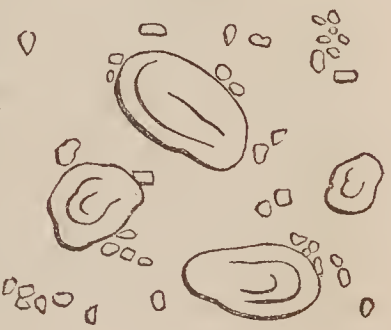
In the case of adulteration with sulphate of lime, or gypsum, there is no effervescence on the addition of the acid, but the resulting liquor, besides answering for the tests for lime, affords a precipitate with chloride of barium, which if collected and calcined with charcoal, gives a residue which disengages sulphuretted hydrogen on the addition of an acid.

Other frauds which have been practised are less easily detected, but these are happily less prejudicial to health, although not always perfectly harmless. I now allude to the adulterations with potato-starch, the flour of leguminous plants, buck-wheat, rice, linseed, &c. I have had occasion to examine several cases of these adulterations.

1. *Adulteration of Wheaten Bread and Flour with Potato-starch.*

In a work addressed to the medical commission of Oriental Flanders, three years ago, I stated that the processes of Rodriquez, Gay Lussac, Bolland, and Chereau, did not afford easy and satisfactory evidence of this adulteration, and that the microscope alone could give positive indications. My conviction is now more than ever confirmed, since M. Donny has applied to this research the observation of M. Payen, that amylaceous grains swell considerably on the addition of solution of potash or soda. If the suspected flour be spread in thin layers on the object-glass of a microscope, and wetted with a solution of potash containing from 1½ to 2 per cent. of the alkali, the grains of the flour of the cereals undergo little or no change, while those of potato-starch extend in large, thin, and transparent layers; after a little practice it is impossible to be mistaken, or to fail in discovering the fraud. To render the distinction still more apparent, the mixture may be coloured with a few drops of iodine water after having been carefully dried. (See fig. 1.)

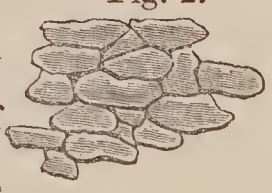
Fig. 1.



The same process is applicable to the detection of potato-starch in bread. For this purpose, two or three drops of solution of potash with a little crumb of bread is put under the microscope, and a little iodine water added, on examination, if the bread be adulterated, the grains of potato-starch, greatly distended, and of a blueish colour are perceived.

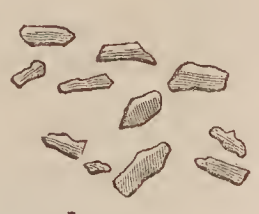
2. *Adulteration of the Flour of the Cereales with Rice or Maize Flour.*

Fig. 2.



The suspected flour is to be kneaded under a stream of water over a sieve. The water which passes through the sieve allows the starch to deposit; it is collected, washed, and examined under the microscope. If adulterated, the angular and semitranslucid particles of rice and maize starch are easily observed. (See fig. 2.)

If care be taken, each time, to collect only those portions of starch which are first deposited the fraud may be discovered, however small the quantity of foreign matter added.



3. *Adulteration of Rye Flour and Bread with Linseed.*

The flour of linseed is very rich in vegetable mucilage. If the adulterated flour be macerated in cold water for several hours, and a few drops of basic acetate of lead be added to the decanted liquor, a very abundant precipitate of gum or mucilage will be obtained. This method has been described by M. Martius, but with the expression of much mistrust in it, and a recommendation of further research on the subject. This mistrust

has appeared to me to be well founded, because pure rye-flour containing above eleven per cent. of gum also yields a precipitate, sufficient to leave the experimenter in doubt. As this fraud is one of those now frequently practised, I have endeavoured with M. Donny to supply the deficiency which existed on this point in the excellent paper which this Chemist has published on the adulteration of flours. On mixing a small quantity of linseed meal with solution of potash, containing fourteen per cent. of the alkali, and examining this under a powerful microscope we detected a great number of small very characteristic bodies, smaller than the grains of potato-starch, of a vitreous appearance, mostly of a reddish colour, and generally in the form of squares or regular rectangles. (See fig. 3.) These little fragments arise from the envelope of the grain, and we have discovered that they may be detected in the flour, and even in the bread of rye, when there is scarcely one per cent. of linseed present. In order to discover them, a very small piece of the bread crumbled, or a small quantity of the sifted flour, is to be mixed with a few drops of solution of potash, and examined under the microscope. It appeared to us that this method left nothing to be desired, either as to the promptitude with which it might be performed, or the decisiveness of the results. Nevertheless, it may be well to mention another process which we have not found any where described. This consists in soaking about an ounce and a half of the adulterated flour in ether for two or three hours ; then decanting or filtering the liquor, and evaporating to dryness. The residue of the evaporation is to be treated with a solution of nitrate of mercury containing nitrous acid in solution, such as is obtained on dissolving mercury in excess of cold nitric acid. The action which ensues occasions the solidification of the oil resulting from the rye into a solid mass of a fine red colour. This is washed with water to remove the nitrate of mercury, and the residue is treated with a small quantity of boiling rectified spirit. The spirit is decanted when cold, and on being evaporated it yields the oil that would result from any linseed that might have been present.

Fig. 3.

4. *Adulteration with Buck-wheat.*

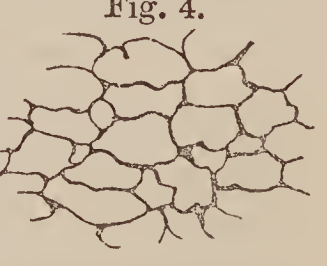
We have found from experience that this adulteration may again be detected by the microscope, the same means being adopted as in the cases of rice and maize. The flour of buck-wheat furnishes agglomerations of starch, resembling those of maize in form. They may, however, be easily detected from the latter.

5. *Adulteration of the Flour of the Cereates with the Flour of Leguminous Seeds, such as Beans, Peas, Lentils, Haricots, &c.*

The characteristic nature of the cellular substance, which the flour of leguminous seed contains, serves to distinguish it from the flour of the cereates.

The suspected flour is sifted, and a small quantity placed under the microscope ; a few drops of solution of potash, containing from ten to twelve per cent. of the alkali, are then added. When the flour under examination contains any leguminous seed, the microscope soon shows the *débris* of the kind of cellulos which is common to this vegetable family. (See fig. 4.) This method is, unfortunately, not applicable to bread made with the adulterated flour.

Fig. 4.



This process is that generally adopted for the leguminous flours, but

M. Donny, who published it, has described another for cases in which the flour of small beans, or vetches, has been used for the purpose of adulteration. This last method has the advantage of being applicable to the discovery of the presence of these substances even in bread.

The flour of small beans (*Faba vesca*) and vetches, acquire a fine red colour, under the influence of successive applications of nitric acid and ammonia, and no others hitherto examined present this character, they all remain colourless or become slightly yellow. Thus, in a mixture containing these seeds, red patches are obtained by this means, which are always visible under the microscope, and the number of which will vary according to the extent of the adulteration. In order to succeed well, the interior edge of a porcelain capsule is covered with a layer of the flour; some nitric acid is then poured into the bottom of the capsule and vapourized, so as to expose the flour to its action. When part of the flour has become yellow, the acid is to be replaced by ammonia, and left exposed to the air.

In detecting small beans or vetches in bread, the colouring principle of these vegetables ought to be isolated as much as possible. To effect this, the bread is treated with cold water; the mixture is then to be thrown on to a sieve, and on allowing it to stand, the filtered liquor separates into two strata; the upper of these decanted and evaporated, is to be exhausted by alcohol; the alcoholic solution on being evaporated, leaves on the edges of the capsule a layer of an extractive substance, which is to be treated successively with the vapours of nitric acid and ammonia. If the bread be adulterated, the extractive matter partially assumes a fine red colour; if, on the other hand, the bread be pure, this colouration never takes place.

A discussion recently took place at the Brussels Academy of Sciences, in reference to the last-named process, and M. Martius stated that he preferred the method wnich consists in testing for the *legumine*, a kind of caseine which is peculiar to leguminous plants. According to this method, the suspected flour is mixed with twice its volume of water, and a few drops of acetic acid added to the filtered liquor; in case of adulteration, a precipitate is obtained.

Theoretically, nothing could be better than this process, which is that which would naturally suggest itself to the mind; in fact, the legumine is precipitated by acetic acid, and as M. Martius has justly observed, there is nothing in the composition of wheaten flour that ought to coagulate with this acid. According to some chemists, this theory is supported by practical results, yet, I have often obtained a precipitate when pure sifted flour, and above all, when wheat pounded in the laboratory under my own eye was used, together with acetic acid of the greatest purity, therefore I cannot agree in this opinion. And why may not one of the constituents of corn acquire through a metamorphosis common to organic bodies, the property of being insoluble in acetic acid? Thus the flour of buck-wheat, which contains no legumine, affords a precipitate with acetic acid.

It is true that the precipitate obtained from wheat is very slight, but it is nevertheless of a nature to diminish the value of the test, especially when it is considered that leguminous substances are only added for adulteration in small quantities. I collected the precipitate with the view of examining it, and comparing it with legumine, and a further investigation would no doubt lead to more precise results, but although little has hitherto been done to elucidate this point, I shall certainly not neglect it. I could not, however, rely on this method alone, as I consider it too inconclusive to found upon it a decision that may affect the honour or fortune of individuals.—*Journal de Pharmacie.*

ON THE GAMBOGE OF THE TENASSERIM PROVINCES.

BY THE REV. F. MASON, A.M.*

In conversation with a distinguished medical officer, and member of the Asiatic Society, I found that he was not at all aware that the Tenasserim provinces produce Gamboge. It has, therefore, occurred to me that a brief notice of the gamboge of these provinces might not be unacceptable to the readers of the Journal, and would contribute its influence to draw attention to the most interesting portion of the British provinces in the east, one that is exceeded by few in the richness and variety of its natural productions.

Three works in my possession describe gamboge each as the product of a different tree ; a fourth represents all to be wrong, and a fifth suggests a different plant still. One refers it to *Cambonia gutta*, a plant, which, as described by Linnæus, has probably no existence. He described a Ceylon plant, and it is now quite evident, says Dr. Wight, "that the character of the flower and ovary is taken from one specimen, and that of the fruit from a different one, owing to the imperfection of his specimens, and his not being aware that the lobes of the stigma afford a sure indication of the number of cells of the fruit."

Another refers it to *Garcinia Cambogia ;* but Dr. Wight says, that the exudation of this tree is "wholly incapable of forming an emulsion with the wet finger," a statement which the writer knows to be correct. The tree is very common in the Tenasserim provinces, but the bright yellow exudation it produces is certainly not gamboge.

A third refers it to *Stalagmitis cambogioides ;* but Dr. Wight remarks, "the juice of this tree differs so very widely in its qualities from good gamboge, that it can never be expected to prove valuable as a pigment."

Dr. Graham has described a Ceylon tree, under the name of *Hebradendon cambogioides*, which is said to produce good gamboge, but no gamboge has ever been exported into the English market from Ceylon. Thus it would appear, to use the language of Dr. Wight, that "the tree of trees, which produces the gamboge of commerce, is not yet known."

Dr. Helfre, who was employed by government as a scientific naturalist in these provinces, at an expense of thirteen hundred rupees per month, reported, "the gamboge of this country dissolves very little with water, and consequently does not yield that yellow emulsion as the common *guttifera*. It will never serve as a colour, but promises to give a very beautiful varnish." This statement was controverted by a writer in our local periodical at the time, who said he had obtained "fine gamboge of the very best description" from our jungles, in which he was no doubt correct, but he erred when he added that it came from the "true *Stalagmitis cambogioides*." A very small amount of botany would have served to preserve him from falling into this error, for that plant has a quinary arrangement of its flowers, while the arrangement of the flowers of those that produce gamboge in these provinces is quaternary.

The hills that bound the valley of the Tavoy river on both sides, from their basis to their summits, abound with a tree which produces a fine gamboge. It is Roxburgh's *Garcinia pictoria*, which he knew produced gamboge, but which he said was liable to fade. As soon as I satisfied myself of the identity of the trees, by an examination of the inflorescence of our plant compared with Roxburgh's description, I coloured a piece of paper, one band with this gamboge, and another with the gamboge of commerce ; and subsequently exposed both to the weather equally for more

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* From the *Journal of the Asiatic Society of Bengal* for July, 1847, new series, vol. vii., p. 661.

than twelve months, but without being able to discover that one faded any more than the other. South of the latitude of the mouth of the Tavoy river, and throughout the Province of Morgui, there is found, on the low plains at the foot of the hills, and on the banks of the rivers, almost down to tide waters, another species of *Garcinia*, that also produces good gamboge. I have no doubt but it is the tree from which Dr. Griffiths furnished Dr. Wight with specimens, and which the latter says "I refer doubtfully to Wallich's *G. elliptica*." We will call it then *G. elliptica*, a species which Dr. Wight has on his list of "species imperfectly known." The foliation and female flowers are, however, very well described, and to complete the description I may add, the male flowers are pedunculated, but the peduncles are short, and they might be characterized as sub-sessile. The anthers, like those of the female flowers, are sessile, depressed or flattened above, and dehisced circularly. The ripe fruit is globose, and not furrowed, As I send along with this paper specimens of both the male and female flowers, any of your botanists will be able to correct me at a glance, if I be in error.

Neither Wallich, Wight, nor Griffiths appear to have been at all aware that this species produces gamboge. Dr. Wight, in a recent number of his Neilgherry plants, says : "Two species of the genus *Garcinia* are known to produce gamboge, most of the others yield a yellow juice, but not gamboge, as it will not mix with water. The species which he has described as producing gamboge, and to which I suppose he refers, are *G. gutta*, *H. cambogioides* (Graham), and *G. pictoria* (Roxburgh). That others may be enabled to judge of the character of the gamboge produced by this tree, I have the pleasure to send specimens of its exudation. In its appearance to the eye, and in its properties as a pigment, I have failed to discover the slightest difference between it and the gamboge of commerce. It serves equally well to colour drawings, the Burmese priests often use it to colour their garments, and the Karens to dye their thread. It is also used by the native doctors in medicine, but I think not extensively. Dr. Lindley, in his new work, the *Vegetable Kingdom*, says, "The best gamboge comes in the form of pipes from Siam, and this is conjectured to be the produce of *Garcinia Cochinchinensis*. As *G. elliptica* is spread all over the Province of Magui, is it not probable that it extends into Siam, and that the Siamese gamboge is the produce, a part at least, of this tree ?

There are several other species of Garcinia indigenous to the Provinces, but I know of no others producing any thing resembling gamboge, except *G. Cambogia ;* the exudation of which, though it will not dissolve in water, dissolves in spirits of turpentine, and forms a very beautiful yellow varnish, for tin and other metallic surfaces.

ON THE PRODUCTION OF OXYGEN FROM CHLORIDE OF LIME.

BY DR. F. KELLER.

An easy and safe method of obtaining oxygen by moderately heating a mixture of equal parts of chlorate of potash and oxide of manganese, reminded me of what Gay Lussac says of the watery solution of the alkaline hypochlorites, namely, that both the pure and common, which still contain chloride and oxide, yield, on being heated for some time at 212°, part of their oxygen—the more, the stronger the basis predominates ; and that powdered oxide of manganese added to the solution increases the quantity of the developed oxygen, whilst at the same time the liquid assumes a red colour from the generated permanganic acid, the residue containing

chloride of potassium, or chloride of sodium and chlorate of potash. Considering the lower price of chloride of lime, it appeared to me of some consequence to examine the nature of this hypochlorite with regard to the generation of oxygen.

One half-ounce of common, somewhat moist, chloride of lime, boiled for some time in two ounces of water, yielded 420 cubic centimetres of oxygen, contaminated with a small proportion of chlorine, but fit for all the usual experiments.

An equal quantity of the same chloride of lime, heated with a quarter of an ounce of powdered oxide of manganese, and two ounces of water in a retort, in the sand-bath over the spirit-lamp, yielded 620 cubic centimetres of tolerably pure oxygen. Variations in the proportions of the ingredients yielded results which varied but slightly from those above-mentioned.

It might be presumed that the oxide of manganese increased the quantity of the developed gas, by having yielded part of its oxygen. But this was not the case. The oxide of manganese can, therefore, only have operated by its distribution among the mass, and by its greater capacity of heat, and any other finely-powdered substance, which cannot easily be decomposed, such as powdered glass, siliceous sand, &c., must in its place have done the same; and, in fact, on making use of the latter substances, I obtained the same results, and in some instances, where the heating in sand-bath was undertaken over a charcoal fire, and only gradually increased, a greater quantity of gas was developed.

In several cases where the gas was received over diluted caustic potash, I obtained from half an ounce of chloride of lime, on the average, 650 cubic centimetres; consequently, 14,896 grains by weight, or 6.2 per cent. of pure oxygen.—*Buchner's Repertorium*, Bd. xlviii.

ROYAL INSTITUTION.

The season commenced on Friday evening, January 21st, with a Discourse by the Reverend the Master of Trinity College, Cambridge, on the "Use of Hypotheses in Science." The attendance was numerous, and the usual assiduity of the managers and their friends was evidenced by the various objects of interest exhibited in the library.

At the close of the lecture, Professor Faraday announced the intention of the managers to admit ladies into the body of the lecture-room, instead of restricting them to the gallery. This is a popular, and at the same time a very proper regulation. It would be better to exclude ladies from the Institution altogether, than to banish them to the semi-circle of vitiated atmosphere, where, on crowded evenings, the heat is so oppressive, that fainting is a common occurrence, and the draught of night air in the passage is the only means of relief. Between the two evils of bronchitis and suffocation, great must be the zeal of those ladies who honour the Institution with their presence, and they deserve the just though tardy reward now conceded to them.

Notwithstanding the long continued prosperity and popularity of the Royal Institution, and the strenuous endeavours of the managers to sustain its high character, we regret to observe the existence of a disposition to foster a controversy from which no advantage is likely to arise, and which we hope will die a natural death. Twenty-nine of the most influential members having given notice of a proposition to introduce an alteration in the Bye-Laws, chapter xx, Mr. Hellyer

has given notice of the following motion for discussion on the 7th of February, when the question will come forward :—

NOTICE BY MR. HELLYER.

That the printed paper, being a revision of chap. xx. of the Bye laws, be referred to the Committee of Managers to be considered and reported on.

That the same be also referred to the Committee of Visitors, to be considered and reported on.

And that a Committee of nine Members, not bearing office in the Institution, be appointed ; and that the same printed paper or proposed revision, together with the Managers' Report thereon, and the Visitors' Report thereon, be referred to the said Committee of Members, to be considered, and to be reported on to the General Meeting.

And that the consideration of the said printed paper or revision by the General Meeting be postponed until such Reports shall have been made.

It would be difficult to contrive a process or mode of proceeding more calculated to disturb the harmony of an institution than this extraordinary proposition. It reminds us of the story of the painter, who exhibited his picture in a market-place, inviting every person who perceived a defect in it, to paint over the part to which he objected. At the close of the day, the picture was obliterated, nothing being visible but the dabs of paint smeared on it by the critics.

If Mr. Hellyer were to carry his motion, we should expect a similar result, and sincerely hope for the prosperity of the Institution, that it will not be seconded.

CHEMICAL SOCIETY OF LONDON.

The Meetings of this Society for the ensuing season commenced on *Monday, November* 1, 1847, when the chair was occupied by the President, W. Thomas Brande, Esq. The following papers have been read at that and the subsequent meetings :—

"*An Account of Experiments with Voltaic Couples immersed in pure Water and in oxygenated Water,*" by Mr. Richard Adie. After detailing a long series of experiments, the author concludes his paper by saying, that "if the view he has been led to adopt stand the test of time, it will reconcile the action of couples formed of oxidable metals, to a general principle—namely, that in all voltaic arrangements the current passes from the side which is changing towards that which is more stationary." When there are exceptions to this principle among the more complicated batteries, Mr. Adie is now inclined to hope that they will become reconcileable to it.

"*On Cumidine,*" by Mr. E. C. Nicholson. The preparation of this base from cumol is analogous to that of aniline from benzol. It is in the form of a yellowish oil at ordinary temperatures, dispersing and refracting light in an eminent degree, at a low temperature it solidifies into a mass of square crystalline flakes. It is very soluble in alcohol, ether, pyroxylic spirit, and the fat oils, and very slightly so in water. Its boiling point appears to be about 225° C. Like aniline, it imparts an intense yellow colour to fir-wood ; but does not afford the reaction with hypochlorite of lime which characterizes that base. It is represented by the formula $C_{18}\ H_{13}\ N$. The author then describes the salts of this base as the sulphate,

nitrate, hydrochlorate, having the formula $C_{18}\ H_{13}\ N + H\ Cl$, and the double chlorides with platina, mercury, &c. The products of decomposition are also shortly noticed.

"*On the Chemical Constitution of Pollen*," by J. T. Herapath, Esq. After reviewing the labours of previous investigators on this subject, the author proceeds to detail his own researches. The subjects submitted to examination, were the pollen of the white and red lily, and of the *Cactus speciosissimus*. The routine of investigation is detailed, and the following results are given on the 100 parts of each:—

	Lilium Bulbiferum. (Red Lily).	*Lilium Candidum.* (White Lily).	*Cactus Speciosis.*
Water	12.650	17.625	15.070
Sugar, and a little malate of potash	14.530	14.285	20.548
Gum and extractive	17.465	18.326	6.392
Albumen	0.873	0.546	—
Extractive with carbonate, phosphate, and sulphate of lime	1.000	0.921	3.196
Yellow fixed oil	7.590	8.059	—
Pollenin	43.012	36.936	46.575
Cerin	0.200	0.300	8.219
Resin	a trace	—	—
	97.320	96.998	100.000

November 15, 1847.—The President in the chair.

"*On the Specific Heat of Bromine*," by Thomas Andrews, M. D. After alluding to the importance of ascertaining the specific heat of this, the only fluid non-metallic element that we are acquainted with, and describing the method of conducting the investigation, the purification of the bromine, and the operation for testing the accuracy of the process, the author finds that the mean of five experiments gives the specific heat of this element as 0.1071. This will, therefore, form an apparent exception to the law of Dulong and Petit, as its specific heat is about one-fourth higher than is required by their theory. This, Dr. Andrews considers, may arise from its liquid form, as there is every reason to believe that the specific heat is lower in the solid than in the fluid state. The result confirms the view of Berzelius, that the atomic weights of chlorine, bromine, iodine, and probably fluorine, are one-half of those usually employed in this country.

"*On the Determination of Nitrogen*," by Mr. J. Mitchell. The author, after reviewing most of the plans adopted for this purpose, and stating his objections to them, gives in detail his own method, which is a modification of that proposed by Peligot, but instead of using dilute hydrochloric acid in the absorbing apparatus and a solution of lime in sugar, he employs diluted sulphuric acid, which contains about 4.5 to 5 per cent. of dry sulphuric acid and a solution of caustic soda, 300 grains of which will about neutralise 100 grains of the dilute acid. This caustic soda is added by a Schuster's alkalimeter, until the

acid liquid is perfectly neutral, the difference in the quantity of uncombined acid, before and after the combustion, indicating the amount of ammonia absorbed during the operation.

"*Analysis of the Bichromate of Ammonia, and some double Salts of Chromic Acid*," by Mr. S. Darby. The salts analysed by the author, with the resulting formulæ, are as follows :—

Bichromate of ammonia	$N H_3$, 2 $Cr O_3$.
Chromate of ammonia	$N H_3$, $Cr O_3 + H O$.
Bichromate of ammonia and chloride of mercury	$N H_3$, 2 $Cr O_3 + Hg Cl$.
Bichromate of potash and chloride of mercury	$K O$, 2 $Cr O_3 + Hg Cl$.
Chromate of potash and chloride of mercury	$K O Cr O_3 + 2 Hg Cl$.
Chromate of mercury (proto)	$Hg_2 O$, $Cr O_3$.
Perchromate of mercury	3 $Hg O$, $Cr O_3$
Chromate of potash and cyanide of mercury	2 $K O$, $Cr O_3 + 3 Hg Cy$.
Chromate of silver and cyanide of mercury	$Ag O$, 2 $Cr O_3 + 2$ Hg. Cy.

December 6, 1847.—The President in the chair. "*On the latent Heat of Vapours*," by Thomas Andrews, M.D. Dr. Andrews, after reviewing the labours of previous investigators, and describing the apparatus employed by him in these experiments, details at length the series of investigations of which the following is the summary :—

	Specific Heat.	Boiling Point.	Latent Heat for 1 Gramme.
Water	1.000	100°.C.	535.90
Alcohol	0.617	77.9°	202.40
Bromine	0.107	58.0°	45.60
Protochloride of phosphorus	0.209	78.5°	51.42
Bichloride of tin	0.148	112.5°	30.53
Sulphuret of carbon	0.319	46.2°	86.67
Sulphuric ether	0.517	34.9°	90.45
Iodic ether	——	71.3°	46.87
Oxalic ether	0.457	184.4°	72.72
Acetic ether	0.474	74.6°	92.68
Formic ether	0.485	54.3°	105.30
Methylic alcohol	0.613	65.8°	263.70
Iodide of methyle	0.158	42.2°	46.07
Acetate of methyle	0.470	55.0°	110.20
Formiate of methyle	0.470	32.9°	117.10

"*On the preparation of Kreatine, and the proportion of that substance contained in different kinds of Flesh and Fish*," by W. Gregory, M.D. After cursorily alluding to Professor Liebig's investigations on this subject, and describing the method adopted for its separation, the author proceeds to describe his own modifications of this process, and the precautions necessary to insure success and avoid loss of product. The results obtained by Professor Liebig and Dr. Gregory, from the 1000 parts of material, are as follow :—

	Liebig.	Gregory.
Fowls	3.200	3.021
Goose	——	0.895
Ox	0.697	——
Horse	0.720	——
Ox Heart	——	1.396
Pigeon	——	0.825
Skate	——	0.607
Cod	——	1.338
Haddock	——	0.614
Brill	——	0.700
Herring	——	1.324

Dr. Gregory is inclined to think that the amount of kreatinine present increases as that of kreatine diminishes; and that it is, in great part at least, formed from the kreatine during the process for the extraction of that body.

December 20, 1847.—Thomas Graham, Esq., Vice-president, in the chair.

"*On the artificial Formation of Crystalline Oxide of Zinc*," by Messrs. William and John Thornton Herapath. The subject of this paper was found lining and partially filling the anterior extremity of one of the earthen retorts used for the distillation of zinc, in the works of Mr. Cox, of Bristol. It occurred as an aggregation of brilliant and prismatic needle-formed crystals, having a vitreous semimetallic lustre by reflected light, but transparent and colourless by transmitted light; their specific gravity was 5.5298, hardness, 4 25. They were exceedingly brittle, and presented a conchoidal fracture. On analysis they yielded an average in the 100 parts of 90.44 oxide of zinc, and 9.56 of a crystalline residue, insoluble in acids, and which was found to consist, in the 100 parts of stannic acid 65.373, and oxide of zinc 34 627, corresponding to the formula $Sn\,O_2 + Zn\,O$. These crystals were probably produced by the slow percolation of atmospheric air into the retort—the oxygen combining with the red-hot vapour of the zinc, and being slowly deposited, assumed the crystalline form.

"*On the power of low-pressure Steam in charring Animal and Vegetable Matter, and the reducing Power of Charcoal at the same Heat*," by William Ferguson, Esq. Two cases of carbonization are detailed by the author—the first in the felted cow-hair, used as a covering for the exposed part of a steam-engine boiler, to prevent oxidation; the second in the wooden cone, which formed the top of a float-gauge in a brewing copper. In the first place, the carbonization had taken place wherever the steam had an exit by leakage or otherwise. In the second, the whole mass of elm wood was charred, and had a strong pyroligneous odour. The sheet-copper which covered this wooden cone was corroded by the acid fumes eliminated by the charring, and had formed some salt of copper, which had been subsequently decomposed by the charcoal, filling its pores with minute crystals of metallic copper. In either of the cases the temperature could not have exceeded 216° Fahr.

NOTICES OF BOOKS.

On Poisons in relation to Medical Jurisprudence and Medicine. By Alfred S. Taylor, F.R.S., Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital. London: John Churchill. Small 8vo, pp. 855.

In reviewing a work so voluminous as the one before us, we cannot pretend to give a complete analysis, and shall therefore select for illustration a few portions of the subject to which particular attention may be usefully directed. When the aid of a Chemist is required in a case of poisoning, it is generally in the early stage, before any medical aid is at hand, and at a time when prompt measures are essential. The life of a patient may depend upon the immediate administration of the proper antidote, and as the efficacy of an antidote in most cases arises from its chemical action on the poison, it is incumbent on the Chemist to make himself acquainted with the principles on which these remedies are given. In the sixth chapter, the author gives instructions on this subject, followed by a table of poisons and antidotes. The table will be found useful for refreshing the memory, but in order to understand its application, it is necessary to study attentively the general instructions which precede it, as well as the remarks contained in the succeeding chapter.

Mr. Taylor alludes to the discussion which has taken place on the use of charcoal as an antidote, but arrives at the conclusion that it is not to be depended on, being in many cases quite inefficient, and in others, in which it has been supposed to be useful, being objectionable on account of the large quantity required, and the uncertainty of the result.

Before an antidote can be selected, it is necessary to ascertain the nature of the poison, for which purpose a chemical examination is often requisite, and this must be done with all possible expedition. But when the urgency of the case is over, and the ends of justice or other circumstances demand a strict investigation, the utmost care and delicacy are necessary in conducting the chemical analysis. In the tenth chapter, Mr. Taylor gives some practical hints on this subject which will be found worthy of attention. Among other remarks he points out the imprudence of giving any opinion before the analysis is completed (page 139), and describes various fallacies which may occur in chemical analysis, unless guarded against by resorting to corroborative tests (p. 140). Tables of poisons and their reagents are introduced (p. 146 to 153), followed by general instructions for drawing up reports of analysis, from which we extract the following :—

In drawing up a report on the *results of a chemical analysis*, the following rules may be borne in mind. A liquid or solid is reserved for analysis. 1. When and of whom or how received? 2. In what state was it received—secured in any way or exposed? 3. If more than one substance received, each to be separately and distinctly labelled; appearance of the vessel, its capacity, and the quantity of liquid (by measure) or solid (by weight) contained therein. 4. Where and when did you proceed to make the analysis, and where was the substance kept during the intermediate period? 5. Did any one assist you, or did you make the analysis yourself? 6. Physical characters of the substance. 7. Processes and tests employed for determining whether it contained poison. All the steps of these processes need not be described; a general outline of the analysis will suffice. The magistrate may thus satisfy himself by an appeal to others (if neces-

sary) to say whether the analysis has or has not been properly made. 8. Supposing the substance to contain poison,—is this in a pure state, or mixed with any other body? 9. The strength of the poison—if an acid or if it be in solution; in *all* cases the *quantity* of poison present. 10. Supposing no poison to be contained in it, what was the nature of the substance? Did it contain any thing likely to injure health or destroy life? 11. Could the supposed poisonous substance exist naturally or be produced within the body? 12. What quantity of the poison discovered would suffice to destroy life, and how far is the dose likely to be modified by age or disease?

There are few reports in which answers to most of these questions, although not formally put, will not be required: and unless the whole of them be borne in mind by the operator at the time an analysis is undertaken, those which are omitted can never receive an answer, however important to the ends of justice that answer may ultimately become.

The results of analysis in the shape of sublimates or precipitates should be preserved as evidence distinctly labelled to correspond with the report, in small glass tubes hermetically sealed. In this way they may be produced for examination at the inquest or trial.

Mr. Taylor is very explicit in his instructions for the detection of arsenic, not only in the contents of the stomach and other fluids, but also in the tissues of the body (p. 359), and in the earth in grave-yards where the bodies of persons suspected to have been poisoned, have been buried. In reference to the latter question, a fallacy which occurred in a recent case is mentioned, and deserves attention (p. 367).

The methods of detecting Prussic acid are also minutely described, with the symptoms, *post mortem* appearances, &c. This subject occupies above sixty pages.

On taking a general survey of the work, the most striking feature in it appears to be the accumulation of a great store of matter illustrated by numerous cases calculated to impress the facts on the memory, and condensed into a remarkably small space, bringing the book within the reach of those whose means are limited, and who, nevertheless, desire to obtain a sound and complete knowledge of this very important subject.

The London and Provincial Medical Directory, 1848. J. Churchill, Princess Street.

The value of this work increases every year, and if the efforts of the Editors were generally seconded by the members of the medical profession, it would almost answer the purpose of a Registration Bill. It is already a reflection on the character of a medical man to insinuate that his name is not in the *Medical Directory*, and in proportion as the credit of the work increases, its authority as a test of qualification will be strengthened. The Editors invite all members of the profession to forward authentic information for the correction of each successive edition, and as every individual is interested in the existence of a correct list, much advantage will arise from an attention to this invitation. It is of course incumbent on the Editors to ascertain the accuracy of every statement furnished, otherwise quacks might insinuate their names in the list by fraudulent means. We believe great care is taken to guard against this evil.

Besides the London list, and the general provincial list, there is now a list of counties, and in each county a list of towns, so that any traveller who may require advice, may ascertain who are the medical

men in the town, and what are their qualifications. There are other additions and improvements in the present edition, which we need not particularize.

A Manual of Pharmacy for the Student of Veterinary Medicine. By W. J. T. Morton, Lecturer on Materia Medica. Small 8vo, pp. 380. Longman & Co.

To be noticed next month.

Outlines of Medical Proof. By Thomas Mayo, M.D. F.R.S. 8vo, pp. 47. Longman & Co.

Under a laconic title, this pamphlet contains a few startling facts.

SHARP PRACTICE.

Mr. Palmer, the engineer of the Western Gas Light Company, has issued a writ against the Editor of this Journal. No lawyer's letter preceded or accompanied the writ; but the person who served it stated, that it was for comments on Mr. Palmer's patent, published in our last number, and also for remarks to the same effect made at a public Board. Mr. Palmer has subsequently declared, that the writ was solely for the remarks of Dr. Ure (page 350), who is also favoured with a writ. We have hitherto considered that letters patent were public property, and open to criticism. If the publication of a professional opinion of a patent be libellous, what security can the public have against the artifices of persons who take out patents for alleged discoveries which are already public property? The opinion of professional men as to the value of patents is taken constantly. If they are to be exposed to actions for libel, for giving a candid opinion, how are the public to obtain information on such subjects? We are informed that Mr. Palmer proceeded against a man some time ago for calling him "a humbug," and, by nimble practice took him by surprize, and got him into prison; but when the case was heard, the Recorder dismissed it, deciding that it was not a libel to call a man *a humbug*.

TO CORRESPONDENTS.

Chloroform.—In quoting Mialhe's remarks on Chloroform in our last number, we accidentally omitted to give the authority, namely, the *Medical Gazette*, from which the article was taken, and the quotation in page 346, which is ascribed to M. Mialhe, is, in fact, from the pen of the Editor, who, in the *Medical Gazette* of December 23, gives a more detailed account of his experiments on the subject, to which we beg to refer our readers, and regret the oversight above mentioned.

H.—The addition of chloride of calcium to diluted hydrocyanic acid for abstracting the water, would not answer the purpose if used as described; but by passing the vapour of diluted hydrocyanic acid over chloride of calcium, the water is abstracted.

"*Caloric.*"—(1.) Perchloride of carbon, of average strength, contains 16 per cent. of chloroform, which separates from the spirit on the addition of water. It is not suitable for use in the form of a lotion.—(2.) The process for preserving lemon juice has, we believe, not been published.—(3.) There is no law prohibiting an Englishman from asking for a Christmas-box, nor is there any law obliging any person to give one to the person who delivers the Journal to the Members.

W. S.—Tincture of orange peel, as well as some other tinctures, deposits a mucilaginous sediment by keeping, whether prepared by percolation or otherwise.—(2.) We cannot answer the question positively, but the discolouration might arise from iodine being set free; the presence of chlorine would account for it.—(3.) Vinum colchici is subject to the change above alluded to in reference to tinctures.

"*Practical*" suggests that the failure of W. R. (page 359 of our last number) in producing chloroform, may probably arise from want of attention to the temperature, the boiling point of chloroform being 140°, while that of alcohol is 170°, assuming, that by raising the temperature too high, the chloroform would come over, dissolved in alcohol.—[Our correspondent appears to forget that a much higher temperature is employed in the process, water coming over which abstracts the alcohol, leaving the chloroform. We should rather attribute the failure of W. R. to the use of bad chloride of lime.]

Our correspondent mentions that a Chemist who is advertising chloroform, sells it diluted with alcohol.—[We think if this has occurred it must be quite accidental, as no person in his senses would be guilty of a fraud so easily detected.]

Z., M. P. S., inquires where he can find any practical information on the bleaching of horn.

Mr. Etherington, about two months ago, sent us a communication on the solidification of mucilage by borax. Although the fact is mentioned in some books, we had fully intended to have noticed Mr. Etherington's remarks, but the letter was accidentally mislaid, and we entirely forgot it. We also received a pamphlet containing a list and description of the several varieties of starch, which was also mislaid with the letter, otherwise it would have been duly acknowledged.

W. W. W.—(1.) The question is answered in our last number, page 297. —(2.) Yes.

J.R. alludes to the indefinite size of a wine-glass as ordered in prescriptions by the term cyathus, and the dessert and other spoonfuls. We consider cyathus, or a wine-glassful, to be ℥ij.

Cochleare magnum, table-spoonful, ℥ss.
——— medium, dessert-spoonful, ℥ij.
——— minimum, ℥j.

None of the glasses and spoons in domestic use are sufficiently accurate for measuring medicine in any case in which an exact dose is required. The graduated wine-glass should be in every house.

I. I. D. (1.) Medicine bottles are made of regular sizes, ℥ii. ℥iii. ℥iv. ℥vi. ℥viii. ℥x. ℥xii. ℥xvi, and medical men generally regulate the sizes of mixtures accordingly. When a mixture exceeds a regular size, by three or four drachms, it must, if "accurately prepared," be put in the larger sized bottle; but it might alarm the patient to observe that the bottle is not full. The Chemist must in this, as in other cases, balance the two evils and choose the least.—(2) In making decoctions, we are not told to add the water boiling, but to add the water and boil it.—(3.) Benzoate of Ammonia. Saturate strong liquor Ammoniæ with Benzoic acid, and set it aside to crystallize, or evaporate at a very moderate heat. See vol. iv. p. 184.—(4.) Mr. Morson.

"*A Country Member*" suggests, that a general appeal might be made by the local secretaries on behalf of the Benevolent Fund; soliciting from Members, 5*s.*; from Associates, 2*s.* 6*d.*

B. B. S.—Yes.

E. (*London*)—We should be very glad if any means could be contrived for shortening the hours of business in the drug trade, but we have already given our opinion on the subject, and have nothing to add at present.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. IX.—MARCH 1st, 1848.

THE UNION OF SCIENCE AND BENEVOLENCE.

If the objects of the Pharmaceutical Society had been confined to the advancement of science and the improvement of education, there would have been but little chance of establishing, within a short space of time, a permanent institution. The lovers of science, for its own sake, constitute a small minority among mankind in general, and even those whose avocation requires a certain amount of scientific knowledge are not equally impressed with the value of that foundation on which their professional reputation rests. The business of a Chemist and Druggist having been carried on for many years merely as a trade, without any recognised education beyond an ordinary apprenticeship, the sudden conversion of a class of men thus constituted into a body of scientific Chemists, would have been a project too chimerical to be entertained. Yet the promulgation of the doctrine that every Chemist and Druggist ought to be acquainted with the elementary principles of Chemistry and Materia Medica, was an appeal to common sense, which almost involved a truism.

The various endeavours which were made by the advocates of Medical Reform to include the Chemists and Druggists in a general educational measure, and to place that body under extraneous jurisdiction, laid the foundation of an additional stimulus to embark in an undertaking for the support of which the abstract love of science would not have been a sufficient inducement. The independence of the body was invaded, its social and political privileges threatened, and, under the plea of introducing education among the Chemists, it was proposed to place them under the controul and superintendence of another body.

If this project had not been met with the most determined opposition on the part of the Chemists, it would have resulted in an extension of the powers of the Society of Apothecaries over the entire department of Pharmacy in this country. The probability of this result was sufficiently obvious at the time, and we recal the fact to the recollection of our readers, knowing how common it is when a danger has been overcome to forget the circumstances on which security depends. Notwithstanding the

proverbial disunion prevailing among the Chemists in their collective capacity, their *esprit de corps* was on the above occasion, roused and stimulated by the threatened invasion of their independence; this led to a desire to establish a permanent union, the objects of which were stated to be education, examination, registration, and representation.

In establishing an Institution of this nature, it would have been imprudent to place reliance on the prevailing excitement, which might prove ephemeral in its duration, and it was thought desirable to enlist in the cause those better feelings of our nature which are more universal in their influence, and less liable to fluctuation, than those which depend upon scientific enthusiasm or political sensation.

With this view a Benevolent Fund was proposed, as a collateral branch of the Institution, which was calculated to promote a social and harmonious feeling among its members, and thus to assist indirectly in the furtherance of the other objects by acting as a bond of union, while it would at the same time furnish a means of alleviating misfortune. The policy and advantage of this adjunct to the Pharmaceutical Society was generally recognized, and among the various motives which led to the influx of members, the desire to support a Benevolent Fund was one of the most prominent. But the establishment of a fund of this description is of necessity a tedious process, and it not unfrequently happens, as in the present instance, that years pass away, and the original enthusiasm partially subsides, before any substantial benefit is realized.

During the period of incubation of the Benevolent Fund, the other objects of the Society made favourable progress—the Meetings were held, Lectures were delivered, the School of Pharmacy was founded, the Laboratory fitted up, and the Transactions published. The Examination and Registration being established completed the machinery of the Institution, which now comprises within itself all that was contemplated at the time of its formation, with the advantage of seven years' experience.

The influence which the Pharmaceutical Society has already produced in raising the qualification of Assistants, checking the influx of uneducated apprentices into the trade, circulating Pharmaceutical knowledge, and drawing attention to the purity of medicines, has already been pointed out, and must be obvious to all who impartially view the progress of events in this department.

The *Dublin Medical Press*, in quoting from this Journal a recent article, describing the nature of the examinations, introduces it with the following remark:—

"Here is a College of Pharmacy on the voluntary principle, and if we be not greatly mistaken, it will in the sequel supplant its doctor-manu-

facturing rival at the Hall*. We watch the experiment with some interest, seeing that the principle might be made available to obtain that reform of medical institutions which the strong or the weak hand of power now prevents."

We have seen similar expressions of interest in the progress of the Pharmaceutical Society in other journals, both English and Foreign, and we think it right occasionally to quote the opinions of our neighbours on the subject for the encouragement of our own Members, especially those who reside at a distance from the metropolis, and are therefore removed from the more immediate influence of the Institution.

While the scientific proceedings of the Society have been steadily progressing, the nucleus of the Benevolent Fund has been gradually accumulating, the dividends—small indeed at first, but swelling by degrees—have been added to the capital, which has been further augmented by numerous donations and subscriptions. With all this accumulation, we have still no cause for boasting, and our entire fund would appear an insignificant item if contrasted with the munificence of the tailors', the linendrapers', and several other benefit societies. It is true that we were the last in the field—that almost every other class of the community (professions as well as trades) had made suitable provision for their unfortunate brethren before this laudable idea entered into the breasts of the Chemists and Druggists.

We have now laid the foundation ; a dinner is about to take place for the purpose of infusing fresh life and vigour into the Institution, and we sincerely hope that the effort will be attended with a favourable result. The prospect of collecting a few pounds for the fund is not the only advantage to be anticipated from this convivial meeting. Such occasions promote harmony, harmony cements union, and union is strength. Although much has been done, a continuance of the efforts hitherto made is as necessary now as it was in the first instance : and the stimulus arising from threatened attacks having for a time subsided, a more enduring and laudable motive should animate us to persevere until the professional and social position of our body is permanently secured.

In reference to the collection, we may be allowed to express a hope that whatever is given will be given cheerfully, and that none of our friends will be deterred from adding their mite by the erroneous idea that small contributions are not worth giving. Numerous subscriptions have already been promised, and some ac-

* While we acknowledge this compliment paid to the Pharmaceutical Society, which cannot fail to be gratifying to the Members generally, we disclaim rivalry with Apothecaries' Hall, which so far as relates to education, has become a medical institution, and in its pharmaceutical functions, is a trading establishment, thus bearing no analogy in either respect to the Pharmaceutical Society.

tually received, in prospect of the dinner, which is anticipated with interest by many Members residing at too great a distance to admit of their being present.

We cannot close our remarks on this subject without an allusion to the late Mr. Terry of Bath, who was a most liberal contributor to the Benevolent Fund, and whose decease is a severe calamity, not only to his family and friends but to society at large. As a Member of the Council residing in the country, Mr. Terry was entitled to receive from the funds of the Society his travelling expenses for each attendance. Instead of receiving the amount on each occasion, he declined to take it until the end of the year, and then handed over the total sum to the Benevolent Fund. In this manner Mr. Terry has contributed, within the last four years, no less than £80 to the fund.

This was not the only evidence of attachment to the common cause evinced by our late friend. He was one of the most regular in his attendance at the Council table, and in all the concerns of the Society he took a warm interest. The announcement of his decease at the last meeting of the Council produced a shock no less unexpected than severe, and a resolution expressing the sentiments of all present was unanimously passed.

THE IMPUDENCE OF A QUACK AND THE IMPOTENCE OF THE LAW.

The case of Sir James Clark *v.* Freeman, reported in another part of this number, is one of the most flagrant instances of determined fraud and effrontery which we have ever met with. It is indeed surprising that so gross an attempt to deceive the public, by tampering with the professional reputation of a medical practitioner, is not immediately made amenable to that punishment which it so justly deserves. The whole profession is indebted to Sir James Clark for the spirit with which he has come forward to expose the fraud, with the view of bringing the offender to justice, and it is much to be regretted that any obstacle exists to the attainment of this object. The case furnishes fresh evidence of the necessity of a new law for the protection of the profession and the public, against the base proceedings of those quacks whose stock in trade is impudence and falsehood, and whose ingenuity is constantly engaged in contriving some new method of imposition. It is incumbent on respectable Chemists generally to repudiate all connexion with persons of this description, and to uphold the principle of truth and fair dealing as the basis of Medical and Pharmaceutical Reform.

The publication of a few flagrant cases of this description will be attended with a good result, by serving as a warning to the public, and especially to the aristocracy, whose example too often induces others to patronize quacks and imposters.

THE CASUALTIES ATTENDING THE INHALATION OF CHLOROFORM.

The death of the guinea-pig at the Royal Institution was by some persons considered rather a fortunate event than otherwise, as it afforded a warning to the public against the incautious and indiscriminate use of anæsthetic agents. This caution, indeed, appeared to be necessary on account of the prevailing opinion that the inhalation of chloroform was quite safe, and might be performed at any time, as an agreeable and amusing experiment, in the drawing-room. The danger of indulging in this habit was further exemplified in the recent case of a young man at Aberdeen, who died in consequence. The following is the report of the case from the newspapers :

"Arthur Walker, a young man in the employ of Messrs. Souter and Shepherd, wholesale Druggists, having occasionally to weigh out a portion of the chloroform, found himself so exhilarated under the effects of the vapour that escaped, that he was tempted to use it on his handkerchief as if it were eau de Cologne, until a habit was formed which became a species of intoxication. His father, who was foreman on the establishment, on being made acquainted with these circumstances, endeavoured to dissuade the lad from such a pernicious practice, but without effect; and then it was soon observed that his nervous system began to give way. Shortly after he was left in the warehouse with a younger boy, and about mid-day having to weigh an ounce of chloroform to order, could not resist the opportunity of inhaling a dose. Having become excited, his companion was rather alarmed, and knowing that he was violent when any attempt was made to reprove him in such a state, he was pleased to see him lay his head quietly down on his arms resting on the table. He was in this state when the principal clerk entered the warehouse, and on his father being called, it was found as he lifted his head that life was gone. Medical assistance was speedily procured, but though the jugular vein in the neck was opened, no blood came. The deceased was in his nineteenth year. There being no coroner's inquest in Scotland, the benefits that would have arisen to society by a professional examination of the case are lost.

No further evidence is required to prove that agents of this description should not be resorted to, except under the advice and superintendence of experienced practitioners.

In the introduction of such remedies some time is required even by the profession in obtaining experience, and the publication of full and particular information respecting the rules to be observed and the dangers to be avoided, will be the best means of guarding against accidents.

The case of Hannah Greener, who died at Newcastle-upon-Tyne, on the 28th of January, has excited considerable interest. The patient, on the 26th of October, submitted to an operation for onychia, which was performed while she was under the influence of ether, and no mischief resulted from the inhalation beyond a slight headache. Another toe being affected with the same, a second operation was performed on the 28th of January, and in this instance chloroform was substituted for ether. Dr. Meggison superintended the inhalation, while Mr. Lloyd operated. Within about two minutes of the com-

mencement, her lips were observed to be blanched, her limbs rigid, and she spluttered in the mouth, as if in a fit of epilepsy. She was laid on the floor, a vein was opened, water was dashed on her face, a mouthful of brandy and water was administered, a rattling noise was heard in her throat, and she was found to be dead.

Dr. Simpson, in commenting on this case, as reported at the coroner's inquest, and also described by Dr. Meggison, doubts the accuracy of the supposition that chloroform was the cause of death, attributing it to asphyxia occasioned by the administration of brandy and water, while the patient was unable to swallow, and the fluid therefore entered the larynx. He supports this opinion by pointing out the identity of the appearances observed on the *post mortem* examination with those which occur in cases of simple asphyxia, and observes that he has in many cases noticed the blanching of the lips and other symptoms described by Dr. Meggison, which symptoms have subsided in a few minutes, by simply removing the chloroform and leaving the patient at rest.

However probable Dr. Simpson's view of the case may appear, we have not heard any blame imputed to the medical practitioners, who acted for the best according to their judgment. Time and experience, together with the extensive circulation of information on the subject, will, it is to be hoped, diminish the risk attending the inhalation of ether and chloroform, by establishing safe and simple rules for the guidance of those who may be called upon for the first time to administer these agents. It is a great mistake to discard or undervalue a new remedy on account of a few cases of failure, or injury arising from its use under unfavourable circumstances; in support of which observation we refer our readers to the following

NOTES FROM AN ORATION ON ANÆSTHETIC AGENTS,

Delivered to the Members of the Hunterian Society, Feb. 8, 1848,

BY T. B. CURLING, ESQ.
Surgeon to the London Hospital.

The lecturer commenced by stating, that he knew of no important advantages gained by the application of pain during an operation, on the contrary, the performance of an operation without pain was of great advantage. In the first place it would do away with the dread of the patient, and in consequence he would be better fitted to bear it, as it was a well-known fact that when a person had a thoroughly confirmed notion that some fatality would arise, this idea would of itself produce the dreaded evil, in illustration of which Mr. Curling narrated several instances. In fact, so persuaded were surgeons of the effect which the mind had upon the result of operations, that no experienced surgeon would willingly perform an operation upon a patient who felt a conviction that it would be fatal.

Another important advantage derived from the performance of an operation without pain was, that the shock was much less, and the recovery therefore quicker and better; in proof of this the lecturer stated that some persons undergo operations without appearing to suffer much pain, coolly watching the manipulations of the surgeon, and such persons have been noticed to make a good recovery.

Mr. Curling stated, that from statistical records which he had collected himself from a private society to which he belonged, as also from the

published statements of Drs. Simpson and Snow, he found that the mortality arising from one of the severe operations was as high as forty-one per cent. before the introduction of anæsthetic agents ; but that, since their introduction, the mortality arising from the same operation had been reduced to only nineteen per cent., being, consequently, more than two to one in favour of their use. This, indeed, was a most important fact, and one which should be well considered by all persons.

Ether and chloroform were no doubt most powerful agents—their effect upon animals submitted to their influence had fully proved this fact : but was it not a most important fact, and one which fully proved their very great value, that during about fifteen months in which these agents had been used in thousands of cases in all parts of Europe and America, frequently as a matter of experiment by persons ignorant of their powerful nature, that only one well-authenticated case of death from their influence had occurred ! But, in so far as this case was concerned, Mr. Curling said, that it did not at all shake his previous good opinion of the efficacy of anæsthetic agents. He had no doubt that in this instance death was owing to some peculiarity in the constitution of the patient, and in this opinion he was sustained by Sir J. Fife, who was in attendance on that occasion, and assisted to perform the *post-mortem* examination of the body. Did it, therefore, detract, in any great degree, from the value of the remedy, which had been used indiscriminately in thousands of cases with good effect, because, in consequence of some peculiarity of constitution, a fatal effect had been produced ? Could not this also be shown of all our powerful remedies, as for instance, opium, hydrocyanic acid, morphia, &c. &c. ?—agents of undoubted power, but which in certain peculiarities of constitution would be injurious. It would certainly not be advisable to use anæsthetic agents upon all constitutions ; for instance, in organic disease of the heart, as also in congestion of the brain, and in other cases in which an experienced surgeon would be able to discriminate.

With regard to the comparative value of the two anæsthetic agents now used, ether and chloroform, Mr. Curling believed that in most cases chloroform would be found to be the most serviceable, being more agreeable to the patient, more rapid in its action, and more transient in its effect ; but in some cases he preferred ether, for instance, when the heart's action was much depressed. He also thought ether preferable when it is desirable to keep the patient long under the influence of the agent.

One of the bad effects arising from these agents was that of vomiting ; but this he thought of little importance, and it might be prevented by abstaining from food for some hours before submitting to their influence. A state of violent excitement was also experienced by some persons when under the influence of chloroform or ether ; but this excitement was soon terminated if the inhalation was carried further.

One of the good effects which would arise from the introduction of anæsthetic agents would be, that persons labouring under lingering and painful diseases, capable of being removed or alleviated by the surgeon, would now quietly submit to an operation who would otherwise have resisted it.

Again, in cancer and other malignant growths, liable to return after removal, the surgeon need not now hesitate in performing an operation for the sake of affording temporary relief, which he would formerly have avoided on account of the amount of repeated suffering inflicted on the patient.

The lecturer advised, that in all cases the surgeon should delegate to an experienced assistant the application of these agents: his duties would commence when the patient was fully under their influence. By this means the operator would not have his attention distracted from the

operation, and would be able to concentrate all his energies on this important point.

The lecturer concluded his remarks by stating, that, although undoubtedly the greatest credit should be given to that person who first introduced the use of ether as an anæsthetic agent to the profession, yet much praise was undoubtedly due to Dr. Simpson for the able manner in which he had investigated the effects of this agent, and particularly for introducing chloroform, another still more important anæsthetic agent. Future ages would reverence those who, like the great Hunter (whose memory they were that day assembled to commemorate) had assisted in the alleviation of human suffering.

[Since the above was in type we have received a printed copy of the oration from the author.]

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

At a meeting of the Council held on Wednesday, the 2d of February, 1848, a letter having been read by the Secretary from Mr. Thomas Terry, communicating the painful intelligence of the decease of Mr. Terry of Bath, a late Member of the Council, it was

Moved by Mr. Tosswill, *seconded by* Mr. Pedler, and *resolved unanimously*,

"That the Council beg to offer their sincere condolence and sympathy with the family of their highly-esteemed friend under their afflictive bereavement, and to record their deep sense of his unremitted attention to the interests of the Pharmaceutical Society, and particularly of his very liberal and repeated contributions to the Benevolent Fund."

"That this resolution be entered on the Minutes, be published in the Transactions of the Society, and a Copy, signed by the President and Vice-President, be sent to the family."

ABSTRACT OF A LECTURE
ON THE DECOMPOSITION OF SALTS BY HOT STEAM.

Delivered before the Pharmaceutical Society, Feb. 9, 1848.

BY PROFESSOR E. SOLLY, F.R.S., F.G.S. &c.

That steam possesses considerable powers in effecting the decomposition of many substances has long been known, but the extent of these powers, the mode in which they act, and the effects to which they give rise in nature, is very little known: it was the object of this lecture to draw attention to this kind of decomposition, and to illustrate some very curious phenomena produced by it.

In introducing the subject, the Lecturer briefly adverted to the mode in which chemical affinity acts, and the two great changes, of combination and decomposition, to which it gives rise; the

latter taking place when some antagonist or interfering cause neutralises or overcomes the force of chemical affinity, the most important of these causes were the following :—

1. *Superior affinity;* the commonest cause of decomposition, being either simple, when one substance separates two others, because it has a superior affinity for one of them, as where potassium decomposes water by abstracting its oxygen ; or double, when two binary compounds mutually decompose each other, and form two entirely new substances.

2. *Spontaneous change*, or a tendency of compound substances to separate into their component parts ; an effect in many cases produced by the mere re-arrangement of the elementary particles into simpler, and more stable compounds.

3. *Mechanical attraction.*—Chemical action, it is well known, is often checked and controlled by the mere force of aggregation ; in some cases it appears to be even overcome by that power, thus strong solutions of the alkaline silicates are decomposed by sand, or finely divided silica, forming a hard and solid sandstone ; in this case the silicate seems to be decomposed in consequence of the aggregative power of the silica.

4. *Heat*, which, like spontaneous change, in many cases produces decomposition by tending to resolve substances into mere simple compounds. In some cases, however, such as oxide of mercury, the decomposition is entire, the substance heated being wholly reduced into its elementary constituents.

5. *Light*, which, like heat, possesses the power of augmenting or diminishing chemical affinity, causing the combination of some substances, such as chlorine and hydrogen ; and separating the elements of a number of compounds, such as those of silver, gold, mercury, &c.

6. *Electricity*, which, in passing through a number of compounds, causes their decomposition. All substances which are thus decomposed, appear to consist of simple equivalents of conducting and non-conducting matter : those which consist wholly of non-conducting elements, are entirely non-conductors, a property which likewise belongs to those compounds containing one equivalent of a conductor, united to two or more equivalents of a non-conductor ; whilst those which consist of equal proportions of conducting and non-conducting matter are electrolytes or conductors, which undergo decomposition when liquid, but non-conductors when solid.

7. *Example.* — When two distinct compounds, having no action in each other, are mixed, if the one from any cause should undergo decomposition, it will, in many cases, tend to induce the decomposition of the substance with which it is mixed, even

though the latter has independently no tendency to change or decompose. Fermentation is of this kind.

8. *Presence.*—Perhaps the most remarkable of all the sources of decomposition, is that kind of influence to which Berzelius, in 1835, gave the name of Catalytic action; a term which, without conveying any theoretical view as to the mode in which these effects are produced, must be taken as solely indicating those changes in chemical composition merely produced by the presence of certain substances, not undergoing any change themselves, or in any way chemically active in producing the effects observed. The decomposition of oxy-water by the metals, and of fused chlorate of potash by oxides of manganese and copper, are good illustrations of catalytic action. Those who advocate the contact theory of electricity, or believe that the mere contact of dissimilar kinds of matter gives rise to the evolution of electricity, may explain these phenomena on the supposition, that, as the electrical equilibrium of matter is disturbed by the contact of dissimilar matter, so the chemical powers of any substance will be more or less modified by the contact of other substances, even though they have no affinity or tendency to combine with the substance which thus influences them.

The decomposition of a substance is generally not caused by one of these forces alone, but by a combination of two or more of them together, the facility with which they act depending on the strength which binds together the elements of the compound. A very great difference is found to exist between even the same class of compounds; thus potassium and oxygen combine with the greatest facility and under any circumstances, however unfavourable; but are separated with very great difficulty, there being a wide range between the point of combination and that of decomposition. Oxygen and mercury, on the other hand, exhibit comparatively but little attraction for each other, and when combined, a very slight determining cause will produce their separation. In some cases chemical affinity and the opposing forces are so nearly balanced, that combination or decomposition may be apparently produced at pleasure. The decomposition of steam by hot iron, oxide of iron, and hydrogen being produced, and the decomposition of hot oxide of iron and hydrogen, steam and iron resulting, is a familiar illustration of this balance of power.

In effects of this kind it is obvious some part of the action is produced by *mass*, as distinct even from that due to mere rapidity of action, or perfect mixture. When a solution of sulphuret of potassium or calcium is poured into excess of muriatic acid, a very different effect is produced to that caused by pouring

muriatic acid into the sulphuret; in the former case bisulphuretted hydrogen is formed, in the latter sulphuretted hydrogen is evolved, and sulphur deposited.

Berthollet, on studying the nature of decomposition, was led to the conclusion, that when a compound was decomposed by the exertion of superior affinity, the result was not merely in accordance with the ratio of affinity, but depended also on several other conditions, and on the nature of the substances present. When, for example, a strong acid is added to a saline solution he conceived that the base would not entirely separate from the weaker acid, and combine with the stronger one alone, but that it would be equally divided between the two, in the proportion of their relative mass. He conceived that single or double decomposition was never complete where no change of form took place—that two salts when mixed together would only half decompose each other, unless one of the resulting compounds was insoluble; when this was the case, or in any other way one of the products could be removed, as the remainder of the salts would then be half decomposed, and, as this action would continue with infinite rapidity, the whole of the compound would finally be decomposed.

Subsequent experiments showed, however, that this view was not correct, and that in many cases, Berthollet was misled by the formation of acid or basic salts. Some interesting experiments on this subject were made by Mr. Phillips in 1816 (*Quart. Jour.*, i, 80) showing the mutual action of carbonate of potash on sulphate of baryta, and carbonate of baryta on sulphate of potash. There are, however, many points connected with the decomposition of salts, requiring further investigation.

For more than fifty years it has been known, that under certain circumstances, steam possesses considerable power in aiding the decomposition of many compounds. This has, for the most part, been either attributed to superior affinity, or to mere mechanical action—it has not been recognised as a distinct and definite mode of decomposition, and, consequently, the recent experiments of Mr. R. A. Tilghman, which, whilst they unite a number of known phenomena under one general head, and exhibit a series of new and unexpected decompositions, show that the force which produces them is one of very high and peculiar power.

Mr. Tilghman has found that a large number of salts, including some of the most fixed and stable compounds known, are readily decomposed by a current of steam, at a high temperature. It appears essential to this action, that the acid itself should be either volatile or decomposable at a high temperature, and the action is probably facilitated by any affinity which the base may have for water, the tendency to form a hydrate assisting in the

expulsion of the acid. The temperature and other conditions requisite for this effect vary with different salts, depending on various circumstances, such as the affinity to be overcome, &c. In many cases also, decomposition is masked, or even wholly prevented, by interfering circumstances; yet these present no exception to the general rule, for it may readily be shown that decomposition takes place as soon as these interfering causes are removed.—*Amer. Phil. Trans.* x. 167.

The interesting experiments of Gay Lussac and Thenard, which arise out of their investigations into the nature of chlorine and muriatic acid, showed many remarkable instances of decomposition under the agency of steam. When, for example, dry chlorides were treated with dry boracic acid, they were not decomposed, though they were readily acted on when exposed to the influence of steam. This, it was at first supposed, depended on the fact that the acid could not exist in the dry state, but afterwards was shown to result from the want of oxygen to combine with the metal of the chloride, and form an oxide which could unite with the boracic acid.

These experiments, and the considerations they gave rise to, were of considerable practical interest in connexion with lime burning, for it was shown that carbonate of lime is far more easily decomposed when heated in steam than in dry air, and on the other hand, that hydrate of lime is readily converted into carbonate when heated in carbonic acid, bearing out the well-known fact that damp chalk or limestone is easier converted into quicklime than it is when quite dry. This action of water has been variously explained. Dumas regards it as either caused by the superior affinity of lime for water at a high temperature, which causes it to combine with the latter and set free the carbonic acid, or else that the steam being partially decomposed by the ignited fuel in the lime kiln, generates a portion of hydro-carbon, which decomposes the carbonic acid of the limestone, reducing it to the state of carbonic oxide (*Traite* ii, 247). Gay Lussac considers that the first explanation is inadmissible, because hydrate of lime is quite as easily decomposed by heat as carbonate, and shows the incorrectness of the second explanation by some excellent experiments, in which decomposition is shown to be wholly caused by the steam, quite independently of the products of combustion. (*Ann. de Ch. et de Phys.*, lxiii, 219).

Although it is perfectly true, that under similar circumstances, the carbonate and hydrate of lime are decomposed with equal facility by heat, yet it is also evident that the affinities are so nearly balanced, that some influence may be reasonably attributed to mass, and that the affinity of lime for water would be rather greater than for carbonic acid when the former was present in

large excess. Another very important consideration is, the facility of diffusion. The mere mechanical effect of diffusion would facilitate the decomposition of carbonate in an atmosphere of steam, or hydrate in an atmosphere of carbonic acid. The conclusion drawn by Gay Lussac from his experiments, was, that the influence of steam in assisting the decomposition of the carbonates, was due to the increased facility given for the diffusion or escape of the carbonic acid.

The most important compounds which Mr. Tilghman has decomposed by the influence of hot steam are the earthy and alkaline chlorides, fluorides, sulphates, silicates, borates, phosphates, and chromates. Two interfering effects require to be guarded against in experiments of this sort, namely the fusibility or volatility of the base when set free; those compounds which are fusible, or the base of which is fusible, are of course more difficult to decompose than others, as becoming superficially fused they are then for the most part protected from further action. On the other hand, when the base is as volatile as the acid, the two though separated by the steam, reunite to form the original compound nearly as rapidly as they are separated.

The decomposition of such substances by steam, is very greatly facilitated by the admixture of some infusible inert porous substance, which shall act as a retainer, mechanically preventing loss by evaporation or fusion.

Common salt, sulphate of soda, sulphate of baryta, &c., may be partially decomposed by steam alone, when sufficiently heated, but the interfering causes just mentioned, prevent more than a small portion from being decomposed; by the use of retaining substances, however, they may be rapidly decomposed to a very considerable amount, muriatic acid, or sulphuric acid mixed with sulphurous acid and oxygen, being given off, whilst caustic soda or baryta remains.

Several different theories, or modes of explaining this action, naturally suggest themselves; amongst these are, superior affinity, diffusion, and catalytic action. It is evident that in all feeble combinations, and especially those where both acid and base have a tendency to form hydrates, the affinity of the acid and base for each other may be weakened by heat, whilst that of both to form hydrates may not, or may be, proportionably less weakened. It is evident that in the case of all haloid salts, the presence of water must be essential to their decomposition by heat, whether alone or in the presence of another acid, as a source of oxygen to the metal, and hydrogen to the chlorine; and it is plain that, in most cases the separation of an oxide from muriatic acid, must be far more easy than that of a metal from chlorine. This action of water does not apply to the de-

composition of other salts, unless we adopt the view of the composition of salts first advanced about 1815, by Davy, and afterwards brought forward by Dulong and others, according to which all salts are assumed to be formed on a similar type, the salts of the oxy acids being considered as consisting of the metals united to the acids + oxygen: thus chloride of sodium being Na, C, sulphate of soda would be Na, So_4. Perhaps the strongest argument in favour of this hypothesis is the manner in which it explains the relation of acid to the oxygen in salts of sesqui or deutoxides. There are, however, serious objections in the number of hypothetical substances the existence of which must be assumed, and in the fact that two distinct bases must be assumed to explain the composition of bi-salts.

There can be little doubt that in several cases these decompositions are materially facilitated by the freedom with which the substances evolved are carried away by diffusion. It is, however, hardly possible to conceive that these effects are wholly caused in this manner; because, if they were, dry air should be expected to produce some effect in decomposing salts like the sulphates, which, however, appears not to be the case; and further, in some cases, the substance evolved has no tendency to diffuse, being at once decomposed, like chromic acid, which is readily evolved from its compounds with the alkalies, at a high temperature, by steam, though at once resolved into oxide of chromium, and oxygen.

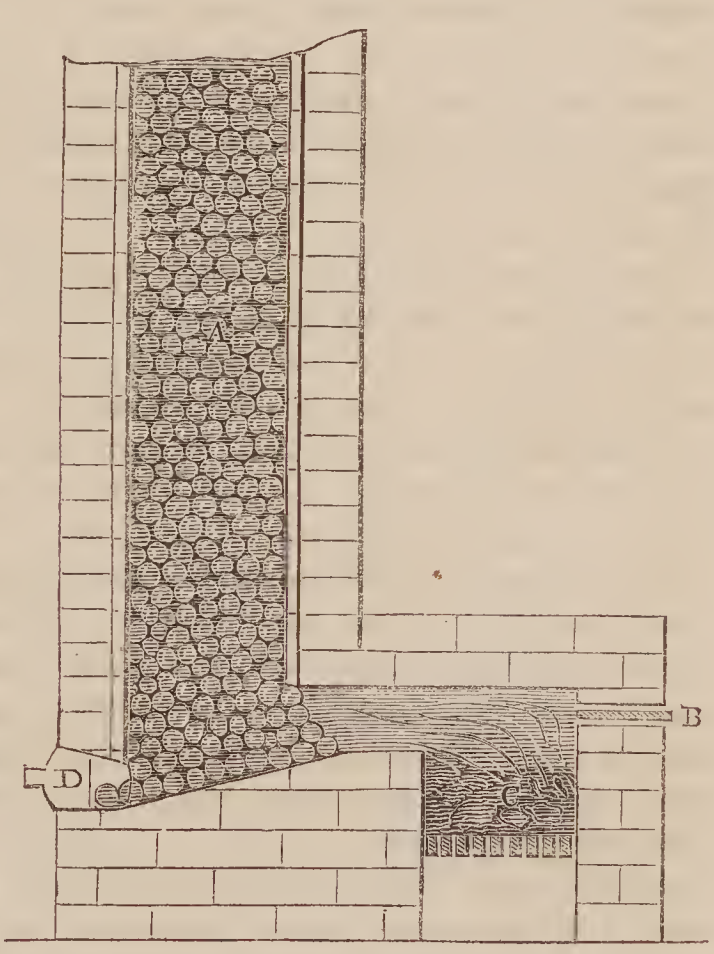
In some respects the process of decomposition by steam approaches more nearly to the effects of catalytic action than to those of any other known mode of decomposition; at all events, though it may not be clear that they depend on the same power, yet it is evident that no other explanation can be considered as altogether comprehending the phenomena in question.

Independently of the scientific interest of these experiments, in connection with the laws of affinity and decomposition, they possess great value in a practical point of view, both as indicating new processes of manufacture, and as explaining the nature of many geological phenomena which are of practical importance in the arts.

One of the most remarkable of the new manufacturing processes, and for which Mr. Tilghman has obtained a patent, is the direct decomposition of soda salts, and especially common salt. The experiments of Gay Lussac and Thenard, as well as others, have long since shown that common salt may be decomposed by the action of various substances, particularly silex, when exposed to the influence of steam at a high temperature; but these cases appear to have been merely considered as decompositions by superior affinity or substitution, the result being only the con-

version of common salt into some oxygen salt, in which the soda is strongly combined to an acid, from which it can only be obtained by a new process. In Mr. Tilghman's mode of working common salt is mixed with some porous retaining substance, such as alumina, phosphate of lime, &c., decomposed by steam at a high heat, and the product simply lixiviated, when it *at once* yields a strongly alkaline lye. It must be borne in mind, that the retaining substances do not act merely by chemical affinity, but that their action is chiefly mechanical; this constitutes an important distinction between this and all other processes, and, as a necessary result, the soda obtained is nearly pure, and requires very little further manipulation.

The decomposition of salt in this mode, may easily be carried on continuously in a kiln, like lime-burning, balls of a mixture of salt and alumina being thrown in above, and withdrawn from the furnace below, when the operation is judged complete. The accompanying wood-cut represents the kind of kiln which has hitherto been employed, though there is little doubt that it will soon be modified and improved, C is the fire fed with coal or coke, A the kiln through which the whole products of combustion pass; the salt balls are thrown in above, and withdrawn from time to time at the discharge door D—B, the steam pipes through which a constant current of hot steam is allowed to pass over the ignited fuel, thus insuring a uniformly damp atmosphere in the body of the kiln.



The passage of the results of combustion through the kiln does not in any way interfere with or modify the decomposition of the salt; various practical precautions must be attended to, a certain temperature and a certain proportion of steam being found most advantageous. Under favourable circumstances

eighty per cent. of the salt employed has been decomposed and converted into caustic soda and muriatic acid.

When alumina is the retaining substance used, the solution of alkali obtained holds a large quantity of that earth in solution, in a very convenient form for the use of the dyer, being readily separated by mere exposure to the air, or even by the action of some colouring matters. When carbonate of soda is to be prepared the solution may be readily carbonated by a current of carbonic acid which precipitates the alumina, or the furnace-balls may be crushed and carbonated, *per se;* on lixiviation they then yield pure carbonate of soda, and the whole of the alumina remains insoluble ready to be employed over and over again in aiding the process of decomposition. For some purposes the presence of a small quantity of alumina in solution does not do any harm: thus, for example, the crude alkaline solution may be at once employed for the manufacture of soap.

Perfectly similar processes may be used to effect the decomposition of salts of baryta and strontia; but with these a somewhat higher heat than that required for the fixed alkaline salts is necessary, the fusibility of the results may be obviated by the use of porous retaining substances such as lime, and the operation may be conducted continuously in a kiln or reverberatory furnace.

In the decomposition of the sulphates a part of the acid passes off pure, the remainder being in turn decomposed by the heat into sulphurous acid and oxygen; it is probable that sulphuric acid might be economically made from a cheap sulphate, such as gypsum, by this process, as far less extensive or costly apparatus would be required than in the ordinary mode of manufacturing it from sulphur and pyrites.

The separation of other acids from bases, such as hydrofluoric, may also probably be practically employed with advantage. The decomposition of salts of the fixed acids, such as silica and boracic, though now more interesting as abstract facts, is probably less likely to lead to practical results. In these cases the volatilization of the fixed acids is assisted by the steam, in the same way that the distillation of oils, &c., is aided by steam: the fact that ignited silica is volatile in a current of steam has been known some time, from the interesting experiments of Jeffries, an account of which was read before the Royal Society in 1840, but not published in the Philosophical Transactions (*Phil. Mag.* 1840, xvii. 299.)

It is evident from the foregoing fact, that in every case, when a hydrated salt is rapidly dried, it is liable to be more or less decomposed; this fact is worthy of attention, as the effect thus produced, in some cases, might introduce serious errors into

processes of analysis. The tendency of chloride of calcium to undergo partial decomposition, when rapidly dried, has been known for some time. It is also worthy of remark, that as all ordinary flames contain hydrogen, they are more or less moist, and consequently have a certain amount of decomposing power; hence the flame of a lamp, or candle even, is able alone to render many salts distinctly alkaline in a very short time.

In conclusion, Mr. Solly briefly adverted to the important light which these new experiments would probably throw on volcanic and other geological phenomena. Thus, for example, the evolution of boracic acid, in the hot springs of Tuscany, which has been accounted for on the supposition of a bed of sulphuret of boron, existing below the surface of the earth, and gradually undergoing decomposition from the action of water, could be far more simply explained, when it was shewn that any salt of boracic acid, such as the borate of lime, is readily decomposed at a red heat by the mere presence of aqueous vapour.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected January and February.

MEMBERS.

Askrigg	Pratt, William, Market Street
Bath	Walker, Henry John, 6, Broad Street
Birkenhead . . .	Jones, Charles, Bridge Street
Burnham Market .	Maynard, Henry Robert
Darlington . . .	Teasdale, Thomas B., 14, High Row
Doncaster	Barker, John Maw, High Street
Donington . . .	Green, John, Church Street
Ewias Harold . .	Jones, Edwin, Lord's Hill Road
Haslingden . . .	Falshaw, John, Church Street
	Falshaw, Thomas, Church Street
Liverpool	Turner, John A., 150, Scotland Road
London	Constance, Edward, 37, Leadenhall St.
	Fuge, Robert, 119, St.John's Street Rd.
	Kernot, George Charles, Poplar
	Saunders, Thomas, 5, St. Martin's Court
Northampton . .	Adkins, William, Sheep Street
Salford	Jones, James, 141, Chapel Street
Watford	Hale, Frederick, High Street
Worksop	Jones, John

MAJOR EXAMINATION.

Smith, John . . . . . Portsea

MINOR EXAMINATIONS.

Clarke, Charles . . . . . Hackney
Gray, Thomas Scott . . . . Melton Mowbray
Moore, Edward . . . . . Brighton

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Bendell, Alfred . .	Mr. Gilpin . .	Newcastle
Breeze, Richard G. .	Mr. Dance . .	Fairford
Budge, Sylvanus . .	Mr. Clarke . .	Richmond
Cotton, John L. . .	Mr. Cotton . .	Barnstaple
Goldsmith, Harry . .	Mr. Foster . .	Brighton
Grimsdale, James . .	Mr. Bartlett . .	Chelsea
Henwood, Nicholas L.	Mr. Geldard .	Plymouth
Herbert, Gideon . .	Mr. Shillcock .	Bromley
Potter, John . . .	Mr. Smith . .	Sutton Coldfield
Stevens, John F. . .	Mr. Bennett . .	Bath
Stroud, John . . .	Mr. Searle . .	Crediton
Witt, Henry M. . .	Mr. Wylde . .	Chelsea
Wood, George . . .	Preston & Sons .	London

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MICROSCOPIC VEGETATIONS DEVELOPED IN PHARMACEUTICAL LIQUIDS.

BY JONATHAN PEREIRA, M.D., F.R.S.

Continued from page 374.

OF YEAST.

Of all the microscopic vegetations which I have noticed hitherto, or shall hereafter have to notice, unquestionably none present such interest as yeast. Every one is familiar with it, and is aware of its important uses in the manufacture of beer and vinous liquids, and, therefore, most persons feel interested in details respecting its nature and uses. Unlike any of the other vegetations to which I have alluded, yeast is the special object of manufacture and commerce. In the *Trades' Directory*, you find *yeast dealers* and *yeast merchants*, and we frequently hear also of *yeast manufacturers* and *yeast patentees*. The disputes which have taken place amongst scientific men respecting the nature of yeast, and the difference of opinion which still exists respecting its agency in fermentation, give additional interest to all inquiries and investigations about this subject. To the naturalist also, many topics of interest and research present themselves respecting it; such as speculations about its origin and convertibility into other vegetable species. To some of these points I shall hereafter allude.

The physician has a special interest in yeast on account of its constituting one of the vegetable parasites found on man. Honnever detected it in the black coating of the tongue of a typhoid patient. It has also been discovered in the liquids of the œsophagus, stomach, and intestine. In some cases probably it may have been introduced by the beer drank by the patient; but in other cases its presence could not be accounted for in this way. As it is developed in the urine of diabetic patients, its presence in urine has been supposed to indicate the existence of sugar, but it has been found also in non-saccharine urine.*

History.—So long since as the year 1680, Leeuwenhoek (*Arcana Naturæ detecta*, p. 1, et seq. ed. nov. Lugd Bat., 1722) described and figured the globules of beer-yeast. He was fully aware of its vegetable nature, but was ignorant of its power of vegetating or growing, and notwithstanding the high magnifying power which he used, he failed to detect the presence of the granules or nuclei in the interior of the yeast-cells. In fact, with the most interesting qualities of yeast he was unacquainted.

The discovery of the real nature of yeast, is comparatively modern. In 1826, Desmazières† published some observations on Persoon's genus *Mycoderma*, which he defined anew, and referred to Gaillon's class of infusory animals, called *Nemazoaria* (now placed among Algæ). He described a *Mycoderma vini*, *glutinis farinulæ*, *malti-juniperini*, *malti-cervisiæ*, and *cervisiæ*. The latter is frequently considered to be the yeast-plant; but Desmazières confounded two things which deserve to be considered entirely distinct, namely, the yeast-plant, properly so called (*Torula cerevisiæ* of Turpin) and a larger filamentous confervoid plant, to which more strictly the name of *Mycoderma cervisiæ* of Desmazières should be confined.

Although Kützing (*Phycologia generalis*) states, that in 1834 he had satisfied himself of the real vegetable nature of yeast, but that being engaged on his travels, was prevented from publishing his observations; yet to Cagniard-Latour is due the credit of establishing the real nature of this microscopical organism.

During the years 1835 and 1836 he communicated to the *Societé Philomathique* some researches on ferments, which were published in the journal called *l'Institut* (Nos. 158, 159, 164, 165, 166, 167, 185, and 199); and on the 12th of June, 1837, he presented to the Academy of Sciences his *Mémoire sur le Fermentation Vineuse*, a notice of which appeared in the *Comptes Rendus* of that period. The report‡ on this memoir, drawn up by Turpin, in the name of himself, Thenard, and Becquerel, was made to the Academy in July, 1838 (*Comptes Rendus*); and the memoir itself was printed in the 68th volume of the *Annales de Chimie et de Physique*, 1838.

About the same time, Schwann was occupied in investigations on this subject, but his observations were not published until 1837 (Poggendorff's *Annalen der Physik*, Bd. xli, p. 184, 1837). He denied that the organized being, found in fermenting liquids, is one of the Infu-

* *Des Vegetaux qui croissent sur l'Homme et sur les Animaux.* Par M. Ch. Robin. Paris 1847.

† Desmazières's observations were first published at Lisle. They were afterwards reprinted in the *Annales des Sciences Naturelles*, t. x., p. 42, 1827.

‡ A translation of this report appeared in Jameson's *Edinburgh New Philosophical Journal*, vol. xxv.

soria, as Desmazières had supposed, but asserted that it is undoubtedly a plant, and that it has great resemblance to many jointed fungi. Meyen, who examined it at Schwann's request, agreed as to its vegetable nature, and considered that the only doubt which could exist respecting it, was, whether it was one of the algæ or a fungus, but its deficiency in green pigment led him to regard it as a fungus. The filamentous fungus found in saccharine solutions which are undergoing fermentation, Schwann therefore proposed to call the *sugar-fungus* (Zuckepilz). Meyen (*Report on the Progress of Vegetable Physiology during the year* 1837, translated by W. Francis, p. 83-84, Lond. 1839) adopts Schwann's proposal, and refers to three species of *Saccharomyces*, viz., *S. vini*, *S. cerevisiæ*, and *S. pomorum*.

In 1837 §, Kützing published in the *Journal für prakti·che Chemie*, Bd. xi, a paper on the microscopic plants growing in pharmaceutical liquids, to which I have before alluded, and of the valuable contents of which I have already so freely availed myself. In this paper, Kützing describes and figures the yeast plant.

On the 20th of August, 1838, Turpin read to the Academy of Sciences at Paris his valuable *Mémoire sur la Cause et les Effets de la Fermentation Alcoolique et Aceteuse*, and which was published in the *Mémoires de l'Academie Royale des Sciences* (t. xvii) in 1840.

Caigniard-Latour and Turpin ‖ suppose that the motion which attends fermentation and the products (viz., alcohol and carbonic acid, obtained by this process are due to the vegetation of the globules of yeast; that, in fact, vinous fermentation is a vital act, the yeast globules taking a part of the elements of sugar necessary for the nourishment of the young plants, and setting free the remainder to be transformed into carbonic acid and alcohol.

This notion was strongly opposed by Liebig and other Chemists, and in the *Annalen der Pharmacie*, vol. xxix, p. 100, 1839, appeared a satirical paper, entitled, *The Mystery of Vinous Fermentation unfolded*, in which a joke was made of the opinions, and yeast jestingly represented as an infusory animal, feeding on sugar, and evacuating by the alimentary canal, spirit of wine, and by the urinary organs carbonic acid!

In his *Chemistry in its Application to Agriculture and Physiology*, (I quote from the second edition of Dr. Playfair's translation, 1842) Liebig not only denies that fermentation is a vital act, but declares that yeast is a body in a state of decomposition, and that the idea that yeast reproduces itself as seeds reproduce seeds, cannot for a moment be entertained.

Whatever uncertainties may exist on the real agency of yeast in fermentation, and however different may be the opinions held respecting the part which this substance plays in the process referred to, no doubts, no discrepancies of opinion, can, I conceive, exist in the minds of accurate microscopical observers with respect to the vegetable nature of yeast, and to the fact that the vesicles of this substance are independent organisms. It is, therefore, greatly to be regretted, that Liebig should have hastily committed himself to such erroneous state-

§ At p. 338 of the present volume, Kützing's paper is stated (by a misprint) to have been published in 1847. It should be 1837.

‖ See an excellent abstract drawn up by Macaire, of the investigations and opinions of Caigniard Latour and Turpin in the *Bibliothèque Universelle de Genève*, N. S., t. xviii, 1838.

ments, and which have obviously hampered him in his subsequent works. In the third edition of his *Animal Chemistry* (edited by Dr. Gregory, 1846) he does not, however, attempt to deny the vegetable nature of yeast, though he thinks that investigation into the nature of this substance is not yet completed.

The distinguished chemist Mitscherlich deserves to be especially mentioned as having very early in the inquiry joined the physiologists and botanists with respect to their opinion of the nature of this substance, and the following is an extract from the *Report of the Academy of Sciences at Berlin*, for February, 1843 (I quote from the translation of Link's *Report on the Progress of Physiological Botany*, published by the Ray Society):—

"In brewing beer, we can distinguish from each other with precision two kinds of yeast, the lower yeast and the upper yeast (*Unterhefe* and *Oberhefe*); the former is generated at a temperature which must not exceed + 7°, and which must not fall as low as 0°; it is the fermenting principle of the Bavarian beer. The most beautifully formed upper yeast is that of the white beer, which multiplies at a temperature of about + 25°. The lower yeast consists of separate globules of the most various dimensions; the author has scarcely ever remarked the formation of a smaller globule on any part of a larger one, the smaller ones are always distributed through the fluid. In the upper part, isolated small globules are scarcely ever remarked, but only large ones, on the end of which smaller ones are developed, and thus give rise to branchings. These propagate by germination; the lower yeast, on the other hand, does not, for the little globules grow isolated in the fluid. In the older yeast, we can very clearly distinguish an envelope with granular contents, which become still more evident when a dilute solution of iodine is poured upon them. The author thinks it very probable that in the lower yeast the globules burst, and that the granular contents are set at liberty. This kind of yeast would, therefore, propagate by spores."

I have already alluded to the doubt entertained whether yeast was a fungus or an algaceous plant. Most writers have decided in favour of its fungie nature. Kützing, however, considers it to be one of the *Algæ*, and places it in the sub-order *Mycophaceæ* (Pilztange) and calls it *Cryptoccus fermentum*. The following is his notice of it:

"Yeast is an alga in its lowest, and a fungus in its higher grade of development. If, for instance, we put yeast in a flat vessel with the fluid to be fermented in the air, solitary yeast globules are produced on the surface. These elongate, arrange themselves in rows, and ultimately grow together. In the elongated cells, two or three punctiform nuclei then arise (like the spores of many fungi); and, lastly, there results from elongation and intimate adhesion of the cells, an articulated filament, whose segments have a cylindrical form. By still further development, the filaments extend themselves either into very delicate fibrillæ, or they expand themselves into larger elongated cells, which finally swell up to the form of vesicular spheres, in which great numbers of little globules (sporidia) are formed; in this stage, therefore, they completely resemble a 'mucor.'"

Description.—Having finished the historical notice of the yeast plant, I proceed to the description of it; and here I shall follow, for the most part, Turpin's elaborate investigations.

In order that he might ascertain the changes which yeast undergoes during fermentation, Turpin spent a night in the brewery of M. Chapellet, and examined the successive phases of the vegetation of the yeast plant.

1. *Fresh yeast.*—Turpin first examined the fresh yeast about to be employed by the brewer. Its density was that of cream, its colour that of *café au lait*, its taste very bitter, and its odour approached that of elder flowers. Examined by the microscope (fig. 22) it was found to be entirely composed of spherical, ovoid, and somewhat pyriform vesicles. They were transparent, of a pale fawn colour, were entirely independent of each other, and motionless. Their size varied from $\frac{1}{300}$ to $\frac{1}{100}$th of a millimetre.* Internally, they contained small globular bodies, which Turpin calls *globulins*.

Fig. 22.

Fresh Yeast.

a. Vesicles overlapping and showing their transparency.

b. Micrometer scale, indicating one-hundredth of a millimetre, with a progressive series of small seeds or seminules, the two first beginning to become vesicular at the centre, the two others showing the thickness of the vesicles, and their interior small globules of variable size.

2. *Yeast one hour after fermentation had commenced.*—The putting of the yeast into the wort, is called by Turpin *sowing* the yeast in a particular territory. An hour afterwards, when fermentation had commenced, he submitted a sample of the yeast to a microscopic examination (fig. 23). He found that the greater number of the vesicles had begun to germinate, and had produced one or two buds more transparent than the maternal or producing vesicle.

Fig. 23.

Yeast one hour after fermentation.

a. Micrometer scale, representing one-hundredth of a millimetre.
b. Seminules or small seeds more or less developed.
c. Ovoid seminule.
d. Sperical seminule with one bud.
e. Ovoid seminule with two almost opposite buds.

* A millimetre is 0.03937 or about $\frac{1}{25}$th part of an English inch ; the $\frac{1}{100}$th of a millimetre is, therefore, the 0.0003937, or about $\frac{1}{2500}$th part of an English inch.

3. *Yeast three hours after fermentation.*—At this time the fermentation had augmented (fig. 24). All, or almost all, the vesicles were now double, or didymous; that is, they consisted of two more or less globular joints, the buds having attained the same diameter as the maternal vesicle, and some of them had began to produce other buds.

4. *Yeast eight hours after fermentation.* — At this time the brewer stopped the process by putting the beer into barrels. Almost all the little yeast plants had become small mucedinous vegetables composed of five or six joints (fig. 25). These were of different diameters, had somewhat variable forms, were transparent, filled with smaller globules, and were terminated by either terminal or lateral nascent buds. The latter appearance showed that these small plants were not perfected when the brewer abruptly terminated their existence, and the presence of the lateral buds demonstrated that the plants were about to ramify.

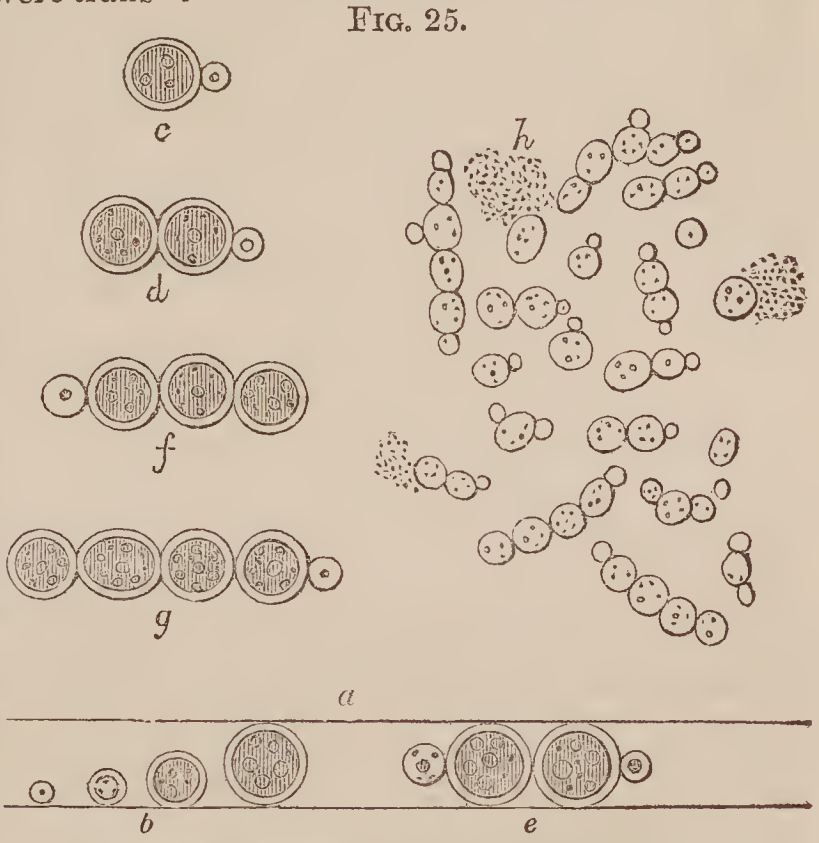
Among these maniliform individuals others were found having only one, two, or three vesicles; some were straight, others arched. Under the microscope the little plants were sometimes seen to emit by explosion a very fine powder, com-

FIG. 24.

Yeast three hours after sowing.

a. Micrometer scale, representing one-hundredth of a millimetre.
b. Spherical seminule with its bud.
c. A seminule having produced a second joint one of which has a bud.
d. The same furnished with two buds or future joints.

FIG. 25.



Yeast eight hours after fermentation.

a. Micrometer scale of one hundredth of a millimetre.
b. Seminules increasing to the hundredth of the millimetre.
c. Seminule with a bud.
d. An individual composed of two joints with one nascent bud.
e. The same, each joint furnished with one bud.
f. The same, composed of three joints and a terminal bud.
g. The same, composed of four joints and one bud.
h. Individuals emitting a fine powder.

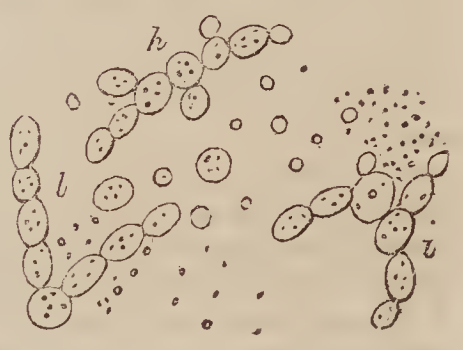
posed of minute globules, which doubtless possessed the power of growing and reproducing the species.

Yeast, then, has two modes of reproduction, one by seminules or small seeds, the other by buds.

At this time some filaments of a species of *Hygrocrocis* were detected; but they were foreign to the yeast plants.

5. *Yeast three days after the commencement of fermentation.*—Turpin endeavoured to imitate the process of the brewer, by putting some vesicles of beer yeast into a solution of sugar contained in a bottle. The same changes took place as those already described. In three days a great number of individuals were found to be more jointed than those in the brewer's vat. Many of them had six or seven joints and lateral branches of two or even three globules (fig. 26, *h*, *i*, *l*). Although more jointed than those of the brewery they were more meagre, contained fewer internal globules, and were consequently more translucid. These differences depended on the fact that they were developed in a solution of sugar only, whereas in the brewer's wort there were present besides saccharine matter, the mucilage of the barley and the oil of the hop, which acted as a stimulant on the *torula*.

Fig. 26.



Yeast contained in a saccharine solution three days after the commencement of fermentation.

h. The torula beginning to ramify and to evolve lateral buds.

i. Lateral branches composed of two joints.

l. An individual whose producing seminule had evolved two branches.

The more or less small intermixed globules are probably abortive seminules.

(*To be continued.*)

ON COCHINEAL (*COCCUS CACTI*).

BY WARREN DE LA RUE, ESQ.

(*Abstract of a Paper read before the Chemical Society of London*).

MICROSCOPIC EXAMINATION OF LIVING COCHINEAL.

By the kindness of Sir James Clark, who furnished me with specimens of the living insect, I have been enabled to examine the physical characters of the colouring matter as it exists in the organism of this little insect, before it is subjected to the process of drying for commerce. On examination by the microscope, the white dust which covers the insect and the adjacent parts of the cactus leaves, on which it feeds, has all the characters of an excrement; it has a curled cylindrical form, is of very uniform diameter, and of a white colour. On removing the powder with a little ether, and piercing the side of the little creature, a quantity of a purplish-red fluid exudes, which contains the colouring matter in minute granules assembled round a colourless and larger nucleus, and these groups float in a colourless fluid. It is evident from this, that whatever may be the function of the colouring matter, it has a distinct and marked form, and does not pervade as a mere tint the fluid portion of the insect.

SEPARATION OF THE COLOURING MATTER.

It became evident from a few preliminary experiments, that the investigation would be greatly facilitated by the employment of a large quantity of material; and as in the course of the inquiry different methods were

adopted for the preparation of the colouring matter, capital letters will be used to designate the various preparations.

A. About three pounds of ground cochineal (technically known as shelly black) was introduced into fifteen gallons of boiling distilled water, and the mixture maintained at that temperature for twenty minutes; the decoction strained through a sieve, was allowed to subside for a quarter of an hour, and then decanted off; whilst still hot, the transparent liquid was mixed with basic nitrate of lead, added with caution to avoid excess; a fine purple lake was thus obtained, the supernatant liquor retaining only a pale buff tinge. After decantation of the supernatant liquor, the lake was thrown on a cloth filter and washed with distilled water until the filtrate gave but a slight opalescence with chloride of mercury, which was found to be a test for the presence of nitrogenous matter. The lead lake was then suspended in distilled water and treated with a copious stream of hydrosulphuric acid, when a precipitate of sulphide of lead and a deep red supernatant liquid was obtained; on stirring the liquid this colour almost disappeared, the colouring matter being evidently absorbed by the sulphide, agreeing perfectly with Arppe's observation. A fresh stream of gas reproduced the colour, which was again absorbed on stirring; after continuous treatment with hydrosulphuric acid, the lead lake being completely decomposed, the filtered liquid was evaporated in a water-bath to a syrup consistence, and the evaporation finished as far as possible at a temperature of 38° C. The semi-solid substance thus obtained was of a deep purple colour, had a strongly acid reaction, and evolved the smell of burnt sugar, as noticed by Arppe. The weight of this substance, which I call crude carminic acid, was three-and-a-half ounces, and one ounce more was obtained from the residue by similar treatment.

B. On repeating the same process the whole product was lost. An excess of the basic nitrate having been employed, the nitric acid set free by the hydrosulphuric acid caused a violent decomposition, with evolution of nitrous fumes, as soon as the carminic acid arrived at a pasty consistence. This agrees also with Arppe's experience.

C. In this operation a decoction of cochineal, made in the described manner, was precipitated with a solution of acetate of lead acidulated with acetic acid (six parts by weight of crystallized acetate, and one part of strong acetic acid). The resulting lead lake, being very bulky, was washed by decantation with boiling distilled water, collected on a filter, dried in a current of warm air, and finely powdered. Seventeen ounces of *crude carminate of lead* were thus obtained.

D. Half a pound of cochineal was boiled with five pints of alcohol, spec. grav. .830. The filtered tincture deposited on cooling, a granular precipitate, consisting chiefly of fatty matter retaining a portion of colouring matter; on concentrating the tincture by distillation, a further quantity was deposited, which was filtered off; the filtrate was evaporated to dryness *in vacuo*, when after eight weeks a gummy residue was obtained. This mass dissolved with great difficulty in a large quantity of absolute alcohol, a red flocculent substance consisting chiefly of nitrogenous matter remaining undissolved. The alcoholic solution filtered off from this deposit, concentrated by distillation, and finally evaporated *in vacuo* over sulphuric acid, dried to a tenacious semi-solid mass, covered with a colourless oily fluid, and containing crystalline particles of a solid fat. After removal of the fats by means of ether, this mass was digested in water at 38° C., which partly dissolved it with a fine red colour, leaving a brown mass of resinous aspect behind, more of which deposited on the cooling of the coloured liquid; the decoction was now evaporated to the consistence of a syrup, and finally dried *in vacuo* over sulphuric acid.

These are all the processes employed to *extract* the colouring matter from the cochineal. I may here remark, before entering on the details of its

further purification, that I obtained other substances on evaporating the mother-liquors from which the colouring matter had been separated by lead salts, which will be hereafter described.

Purification of the Carminic Acid.—In my first attempts to purify the colouring matter, I proceeded in the following way :—An aqueous solution of the crude carminic acid (*A*) was precipitated with acetate of lead, the precipitate of carminate of lead well-washed and decomposed by hydrosulphuric acid : the red supernatant liquid was first concentrated on the water-bath and finally dried *in vacuo ;* a highly hygroscopic purple residue was thus obtained.

I could not, by whatever means I adopted, effect the decolorization of the colouring principle. In several attempts I heated the solution for some hours to 100° C., keeping up a continuous current of hydrosulphuric acid, and in other experiments a stream was made to pass for several days through the disengaged colouring matter, but without the slightest change in its aspect. From these experiments, made with the greatest care and at several periods, I am led to the same conclusion as Arppe, that Preisser must have been mistaken in his results ; and I regret that I cannot throw any light on the probable cause of his error.

Several combustions of the carminic acid thus purified were made ; the resulting numbers, however, became useless by the subsequent observation that this acid was by no means pure. A sufficient quantity being incinerated left a residue of acid reaction, which was suspected to contain phosphoric acid. Carminic acid burning only with great difficulty, it was reconverted into carminate of lead, the oxide of lead dissolved out of the residue obtained after fuming by acetic acid, which left a white residue of metaphosphate of lead, together with a little lead. The white residue was soluble in dilute nitric acid, and exhibited, when placed before the blow-pipe, the character of metaphosphate of lead ; other tests likewise confirmed the presence of phosphoric acid. It will hereafter be seen that the process of extracting the colouring matter by alcohol (*D*) does not exclude the phosphoric acid, which in all probability existed in the colouring matter analysed by Pelletier. It is further evident, that the presence of phosphoric acid explains most satisfactorily the facts observed by Arppe.

a. In order to separate the phosphoric acid, another portion of crude carminic acid (*A*) was precipitated with acetate of lead. Three-fourths of the carminate of lead produced, were decomposed by hydrosulphuric acid, and evaporated to dryness in the way already mentioned. The dry mass being dissolved in cold absolute alcohol, and filtered from a slight flocculent brownish residue, was heated to ebullition in a water-bath, and mixed with the remaining fourth of the carminate of lead, which had been previously reduced to a fine powder ; the ebullition was continued for a few hours. In this method the free phosphoric acid combined with the lead, liberating an equivalent portion of carminic acid, which was taken up by the alcohol. The alcoholic solution was filtered whilst hot, concentrated by distillation, and then evaporated *in vacuo* in the presence of sulphuric acid ; it dried into a granular mass of a deep purple-brown colour, detaching itself spontaneously from the sides of the vessel, and on examination by the microscope, was found to be a beautiful transparent crimson substance, exhibiting only slight, if any, signs of crystalline structure ; by pulverization it became of a fine scarlet colour ; it left a mere trace of ash, and was found to be perfectly free from phosphoric acid. It was highly hygrometric*.

* In consequence of this it was found convenient to dry the carminic acid intended for analysis in little stoppered tubes in the air-pump, as the stopper could be rapidly inserted after desiccation, and access of air effectually prevented.

The result of several analyses of pure *carminic acid*, when converted into the most simple expression, lead to the following formula, C_{14} H_7 O_8 ; but an analysis of a copper salt renders it probable that this formula has to be doubled, and that the composition of carminic acid is expressed by the formula, C_{28} H_{14} O_{16}.

From the foregoing experiments, it seems that the best method of obtaining pure carminic acid is to precipitate the aqueous decoction by acetate of lead ; to decompose the washed carminate of lead by hydrosulphuric acid, and to throw down the carminic acid once more by acetate of lead, previously mixed with acetic acid ; to decompose the carminate of lead by hydrosulphuric acid ; to evaporate to dryness and redissolve the carminic acid in absolute alcohol ; then to digest the alcoholic tincture with carminate of lead ; and lastly, to precipitate the trace of nitrogenous matter by ether, the pure carminic acid is obtained from the filtrate.

As thus prepared, carminic acid has the following properties : it is a purple-brown friable mass, transparent when viewed by the microscope, and pulverizing to a fine red powder ; soluble in water and alcohol in all proportions, very slightly soluble in ether, which does not, however, precipitate it from its alcoholic solution if free from nitrogenous matter. It is soluble without decomposition in concentrated hydrochloric and sulphuric acids. It is decomposed by chlorine, iodine, and bromine, which change its colour to yellow, and the latter on warming or by standing gives a yellow precipitate soluble in alcohol. Nitric acid decomposes it even if highly diluted : I shall have occasion to refer to this decomposition presently. It bears a temperature of 136° C. without decomposition ; on gradually increasing the temperature a quantity of an acid liquor is produced, and at a red heat it intumesces and gives off a small quantity of red fumes, which condense : it gives no trace of oily matter.

The aqueous solution has a feeble acid reaction ; it does not absorb oxygen. A volume of this gas contained in a tube with carminic acid over mercury did not change by absorption after exposure for several months. The fixed alkalies and ammonia give no precipitate in the aqueous solution, merely changing its colour to purple ; in the alcoholic tincture they produce purple precipitates ; all the alkaline earths produce purple precipitates ; sulphate of alumina gives no precipitate, but on addition of a drop of ammonia, the carminic acid is immediately taken down as a beautiful crimson lake ; acetates of lead, copper, zinc and silver give purple precipitates, the latter is immediately decomposed, and silver deposited ; the nitrates of lead, mercury, and silver reddish precipitates ; protochloride and bichloride of tin no precipitates, but change the colour to a deep crimson.

ACTION OF NITRIC ACID ON CARMINIC ACID.

Nitrococcusic Acid.—When acting with nitric acid on "carmine" (carminic acid), MM. Pelletier and Caventou obtained white acid crystals resembling oxalic acid, but differing from this acid in several of its properties. M. Arppe found that the acid produced was oxalic acid. In my experiments I obtained the following results :—One pound and-a-half of crude carminic acid was gradually introduced into ten pounds of nitric acid, spec. grav. 1.4, and digested at a moderate heat ; a violent evolution of nitrous fumes succeeded each addition of the carminic acid ; after the whole quantity had been introduced and the action had somewhat subsided, the mixture was transferred into a smaller vessel, and the action continued at the boiling point for about two hours ; by this time the greater part of the nitric acid had evaporated, and on withdrawing the vessel from the fire and allowing the mixture to cool, a crystalline cake was obtained, which, on examination, was found to consist partly of a new

acid and partly of oxalic acid. To separate the oxalic acid, it was dissolved in a large quantity of boiling water and treated with nitrate of lead as long as any precipitate formed ; this was collected and decomposed by boiling with dilute sulphuric acid ; the filtrate from the sulphate of lead yielded a large quantity of prismatic crystals of oxalic acid, which were obtained perfectly white and pure, after two or three crystallizations with the aid of a little animal charcoal.

The yellow liquid filtered from the oxalate of lead, was concentrated and separated from a fresh portion of oxalate which deposited on concentration, the evaporation was then continued until a large quantity of crystals formed ; the solution on cooling deposited a very bulky mass of yellow rhombic prisms, which were drained and dried, and re-dissolved in a sufficient quantity of boiling water, which, on cooling, deposited the acid (for which I propose the name of nitrococcusic acid) in beautiful crystals free from any lead salt ; it was recrystallized twice more, by which means it was obtained perfectly pure.

The results of several analyses lead to the following as the formula for nitrococcusic acid :—$C_{16}\ H_5\ N_3\ O_{18} + 2$ Aq.

Properties of Nitrococcusic Acid.—It is of a yellow colour, crystallizing in rhombic plates, and presenting very different aspects, according to the circumstances under which it is crystallized. Its solution stains the skin yellow, it is soluble in cold, but considerably more so in hot water, soluble in alcohol, and very soluble in ether. All its salts dissolve readily in water, and most of them in alcohol ; it deflagrates violently on being heated ; it dissolves iron and zinc, becoming dark-coloured. It is decomposed by sulphide of ammonium, with separation of sulphur and the formation of the ammonia salt of a new acid, which I have not yet examined.

The following is a synoptical table of the analyses of nitrococcusic acid and its compounds :—

Hydrate of nitrococcusic acid	$C_{16}\ H_3\ N_3\ O_{16}$		$+ 2\ H\ O.$
Hydrate of nitrococcusic acid as crystallized from water	—	—	$+ 2\ H\ O + 2$ Aq.
Nitrococcusate of potash	—	—	$+ 2\ K\ O.$
Nitrococcusate of ammonia...	—	—	$+ 2\ N\ H_4\ O +$ Aq.
Nitrococcusate of baryta	—	—	$+ 2\ Ba\ O + 2$ Aq.
Nitrococcusate of silver	—	—	$+ 2$ Ag. O.

INVESTIGATION OF THE MOTHER-LIQUOR FROM WHICH THE CARMINIC ACID HAD BEEN SEPARATED.

On evaporating the mother-liquors of carminic acid, and separating the lead held in solution by means of hydrosulphuric acid, they all gave the following results :—on acquiring a syrupy consistence, a white chalky-like matter subsided ; this was separated by filtration, and proved to be a new crystalline body. The liquor filtered off from this substance deposited a small quantity more on further concentration, and could only be dried to a soft tenacious mass, partly soluble in alcohol, the rest being soluble in water. From three pounds of cochineal five ounces of this soft matter were obtained, showing that the precipitation by a lead salt had effected the separation of carminic acid from a large quantity of foreign matters. This gelatinous matter appears to be of a complex character, but I have not yet examined it fully.

To purify the chalky-like matter it was well washed with cold water, and crystallized twice by solution in boiling water and evaporation ; it was then dissolved by boiling it in a just sufficient quantity of water ; animal charcoal was now added, and the ebullition continued for a few minutes; the solution filtered whilst hot, deposited on cooling a mass of silky crystalline tufts, completely filling the liquid, and when collected and dried

they aggregated into paper-like masses of a silky aspect. I obtained, in three experiments, four parts of the new body from 1000 of cochineal.

The results of several analyses lead to the formula, $C_{31}\ H_{11}\ NO_6$.

Careful and repeated examinations for sulphur proved the absence of this element as a component of the new white substance. I have been unable to produce a compound to controul the proposed formula, though several methods were adopted; amongst others, I attempted to form a lead compound by adding acetate of lead to an ammoniacal solution of the substance; I obtained merely a bulky precipitate, consisting of little else than oxide of lead.

This substance is sparingly soluble in cold water, much more so in boiling water; insoluble in alcohol and ether; soluble in hydrochloric acid, which appears to be driven off by evaporation, leaving the substance in large crystals. In a large quantity of nitric acid it dissolves with a slight evolution of gas; the solution evaporated spontaneously furnishes long crystals, which are in all probability a new acid; if dissolved in a small quantity of nitric acid, the mixture becomes spontaneously heated, violent action takes place, and the product is lost; frequently the substance becomes blackened into charred masses. It is soluble in ammonia, from which it is again recovered by the evaporation of the ammonia. It is soluble in the fixed alkalies, and is precipitated from these solutions by saturating with an acid.

MICROCHEMICAL EXAMINATION OF ANIMAL TISSUES.

BY DR. DONDERS,

Lecturer on Anatomy and Physiology in the School for Army Physicians at Utrecht.

Having been requested, some time since, by Mulder, to undertake, in connection with him, some microscopical examinations of the more universally distributed animal textures, employing at the same time reagents, I readily acceded thereto, and the results of these experiments are contained in the sixth number of *Mulder's Physiological Chemistry*,* where they are enumerated in the same order as we obtained them, without distinguishing facts already well-known from new discoveries. It appeared to me of importance to draw especial attention to the latter, and to offer some observations respecting the employment of tests or reagents in similar experiments.

Chemical reagents are so generally employed in microscopical examinations of organic textures, that one wonders at the paucity of results obtained by them, and becomes tempted to give them up as unavailable. The reason of this failure, however, is to be found in the fact that most physiologists anticipated a too rapid effect. They usually applied their powerful reagents only at the moment of examination, and thus, as our experiments have taught us, we obtain no results at all. On the other hand, Chemists who allowed the reagents to act for a longer time, neglected the use of the microscope, and had, moreover, no clear idea of what we call elementary forms.

Mulder was the first who asserted that chemical experiments will never lead to the desired result, if they are not guided by a clear knowledge of the anatomical composition of the textures, and that science will only then derive advantage from them when we endeavour to discover the composition of every part distinguishable morphologically. He applied, therefore, to Harting, and microchemically examined with him the different textures of

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* *Versuch einer allgemeinen Physiologischen Chemie*, von G. T. Mulder, aus dem Holländischen übersetzt, von Jac. Moleschott. Heidelberg, C. F. Winter.

plants, and the interesting results of their labours are contained in the fifth number of his *Physiological Chemistry*, and this same conviction procured me the opportunity to examine with Mulder the animal textures in the same manner.

A few words about the term elementary forms, will, therefore, not be considered as superfluous. *Elementary forms are those peculiar microscopic parts of tissues which cannot be further separated into homogeneous constituent forms.* According to this definition, the primitive muscular bundle, although containing many primitive fibres, is the elementary form, because it is surrounded by a proper membrane, and contains, moreover, generally, nuclei, so that the entire primitive bundle cannot be again divided into homogeneous constituent forms. On the other hand, in connecting or cellular tissue, we must go back as far as the primitive fibres, and consider these as elementary forms, since the primitive bundles of the same, which are, moreover, not always strongly marked, can in their developed state be further divided into homogeneous constituent forms, namely, into primitive fibres. With respect to the nerve tubes, the elastic fibres, &c., with respect to cells and lamellæ, whatever form they may have, no doubt can exist. In cartilaginous tissue, however, the cartilaginous corpuscle must be considered as the elementary form, although it contains several cells, and a capillary vessel filled with blood corpuscles and liquor sanguinis, it has, with respect to the other fundamental forms of the same texture, anatomically and physiologically the character of an elementary form. The idea of an elementary form comprises, therefore, by no means the idea of homogenity, for they mostly consist of heterogeneous parts, and only a few, such as the fibres of cellular tissue, elastic fibres, &c., appear to be homogeneous.

The method we observed in our experiment, was the following :—As we had found it necessary to allow the reagents to act for some time before we proceeded to the examination, a number of objects which required no further preparation for the microscope, were placed in a small watch-glass, and the reagents having been added in excess, the whole was covered with a wine-glass, and left alone on a smooth board. In this manner the preparations were properly protected against dust, while the air was sufficiently excluded. For examination, they were placed with a drop of the fluid reagent upon the object-glass, and first examined in this state ; afterwards some water, or some other reagent was added. Hollow object-glasses are very convenient for such experiments, for in them the changes may be continually watched, as they occur.

The preparations themselves are best taken from tissues dried at an ordinary temperature, in which albumen does not congeal. If the dried texture has not been kept too long, the addition of water is generally sufficient to give it the appearance of a fresh preparation. If reagents are employed, even very diluted acetic acid, there is no difference at all ; and if saturated solutions are employed, and the influence of water avoided, which is often advantageous, they are even preferable, in every respect, to fresh preparations.

1. *Caustic Potash.*—A clear, perfectly saturated solution of potash is one of the most important auxiliaries for histo-chemical investigations. Valentin and others have also employed a (saturated ?) solution of potash, but to conclude from the insufficient results which Valentin obtained in the examination of the horny tissue, for which he preferred sulphuric acid to a solution of potash, it is to be supposed that they did not generally allow it sufficient time to act. Its advantage for isolating the cellulose, and the chitin skeletons of insects, which are both insoluble in it, is well known.

The saturated solution is much preferable to the more diluted. The first softens most of the elementary forms without dissolving them, and generally without destroying their appearance ; so that, upon a gradual addition of water, all the changes may be observed by the microscope, which the softened elementary formations undergo in the course of subsequent solution, which

is of great importance. A solution not saturated, on the contrary, dissolves immediately, the soluble forms, and thus disables us from watching the changes which the elementary forms undergo, both whilst being softened, and afterwards when dissolved by the addition of water, and nothing remains but what is insoluble. This more diluted solution will, however, be useful, if we intend to examine uninterruptedly for some time all changes, in which case it is necessary to employ hollow object-glasses. But as this examination costs much more time, without leading to more striking results, a saturated solution will always be preferable, to which, during the examination with the microscope, water may be gradually added by means of a hair, as advised by Heule.

This solution is of the greatest importance for the examination of horny textures. By it, it can be proved in the most decided manner, that those little horny lamellæ, which are cornified in the highest degree, and of which some still doubted whether they had ever been perfect cells, are actually cells in which the cell-wall, the contents and the nucleus, are only apparently blended together into one homogeneous mass. If the corneous textures which we have examined (the epidermis, the epithelium of the mucous membranes, nails, cow-horns, the hoofs of horses, whalebone, tortoiseshell, quills, in which latter Schwann imagines that he saw the transition of cells into fibres, of which he has given drawings) are kept for some hours or days in a saturated solution of potash, they are softened, and generally no distinct texture can be discovered in them by the microscope; but scarcely is a single drop of water added, when the little lamellæ are seen to swell into the most magnificent globular or elliptical cells, the intercellular substance generally floats away in granular forms and dissolves itself, and the cells, particularly if some motion is employed, float about isolated in the fluid. In many cells, *e. g.* those of the nails, cow-horns, quills, distinct nuclei are to be seen, which at first were not at all visible, or only with some difficulty. These nuclei do not resist the influence of the solution of potash so long as the cell-wall, which latter is not dissolved, even after having been exposed for twenty-four hours to the potash, so that, after this time, the cells are to be seen floating and rolling in the form of strongly distended circles, whose contents are perfectly clear.

This phenomenon is explained very simply. The saturated solution of potash softens both the intercellular substance and the original contents of the cells, and reduces both to a condition in which they are soluble in water. If now some water be added, the intercellular substance is dissolved and the water penetrates through the walls of the cells, which become thus filled with a saturated solution of their original contents in potash. The water which is afterwards added, penetrates now into the cells by means of endosmose, and distends them considerably. This shows that only undamaged lamellæ can swell into cells. If the section has been so made that the lamellæ are divided by it, which is easily the case with whalebone, where the lamellæ are very large, they cannot swell into cells, and are, moreover, difficult to isolate. The little piece used for examination appears then like a net of fibres, the lamellæ which have separated partly from one another, and only cohere by their ends, being seen from the narrow side.

If acetic acid be added to the swollen cells with the absolutely clear contents, a fine granular precipitate generally forms in the same, very likely the result of the protein belonging to the original contents of the cell. The pale (discoloured) cell-wall becomes at the same time again darker, just as on the addition of other acids.

The time which is required for softening horny lamellæ by potash, so that they may swell by the addition of water into globular cells, is very different. For the epithelium of the cavity of the mouth twenty minutes are sufficient; for the epidermis of the fœtus one hour, for that of an adult three hours; for that detached in cases of psoriasis only ten minutes; for

nails, cow-horns, hoofs, whalebone, and quills five hours are required, but tortoiseshell requires forty-eight hours. For the most of these substances, quills excepted, the term may, however, be prolonged to twenty-four hours, and even to more.

The epithelium of the *serous membranes* and *vessels* dissolves in potash, without assuming a cellular form, so that it may be doubted whether these lamellæ are or have ever been perfect cells.

The lamellæ and fibres of the *proper structure of the hair* are in a few hours dissolved by potash; they do not however appear as cells, resembling in this respect the epithelium which covers the hair, this latter does, however, resist much longer the influence of potash.

The scales of fishes have been very correctly described by Maudl. They do not belong to the corneous textures; they resist very long the influence of potash, which does not assist in developing their structure. They become first brittle, then soft, but no cells are perceived.

The fibres of cellular tissue (from whatever part it may be taken) become after 4—26 hours granular in the potash solution; sometimes the fibrillæ assume actually the form of a rosary, which is especially observed in the *Lig. sacro-tuberosum.* Upon the addition of water they dissolve quickly, whilst the intermixed elastic fibres remain everywhere, without exception, undissolved.

The fibres of involuntary muscle are granular after three hours; they become isolated sometimes and quickly dissolved upon the addition of water, whilst here also the intermixed elastic fibres remain behind undissolved. Those of the middle membrane of the arteries of a young sheep are easily isolated, and float about in the solution of potash; those of human arteries become granular, are not isolated, and not even singly to be recognised.

The striped primitive bundles of voluntary muscle are perfectly softened after five hours, and are easily isolated; at the same time the isolated primitive fibres are distinctly recognisable as rows of beads. The nuclei, especially in amphibious animals, in which they are frequent, and spread over the whole primitive bundle, are swollen, and become, by the addition of water, so large that they look like small, almost globular, cells. If more water be added, the whole bundles, together with the nuclei, contents, and sarcolemma, are dissolved.

Of bone cartilage (which had been obtained by continued maceration in diluted muriatic acid) the whole substratum was entirely dissolved after five hours exposure to potash (if water had been added, the solution was only partial after five hours, but perfect subsequently) so that only a few grains (insoluble salts?) remained undissolved. After five hours the osseous corpuscles are seen to swell upon the addition of water, and within them a row of nuclei, some of which are sometimes surrounded by cells; with the transparent substratum these osseous corpuscles form a mass which is very much like true cartilage.

Fat cells, especially those of the sheep, resist for hours the influence of potash. An exterior capsule, which appears to consist of cellular tissue, is dissolved by an addition of water, but the innermost membrane is only with difficulty dissolved in potash, and prevents its effect upon the fat itself. *The walls of the finest capillary vessels* resist scarcely one hour. The *elastic fibres* of the larger vessels resist for many days. The fibres of the striated coat, which isolates itself easily, remain at first unaltered, and become, after sixteen hours, less circumscribed in consequence of their swelling. They do not, however, dissolve: these elastic fibres alone remain behind, therefore, after a few hours, when the muscular fibres and the cellular tissue fibres are dissolved.

If *blood* be mixed with a saturated solution of potash, the blood corpuscles become of a deeper yellow, and are not dissolved, even after many hours; if water be added, they swell, many lose their flattened form and become

globular, with two small impressions. If more water be added they become paler ; but if acetic acid be added, they shrivel and become more distinct. At last they are actually dissolved. After having been exposed for a long time to the influence of alcohol, they are much more slowly, but equally changed by potash ; the above-mentioned changes are then even more distinct. The saturated solution of potash is an excellent means to make the blood corpuscles again visible from dried blood, and to recognise them with certainty ; it will, therefore, be appropriately employed in forensic investigations.

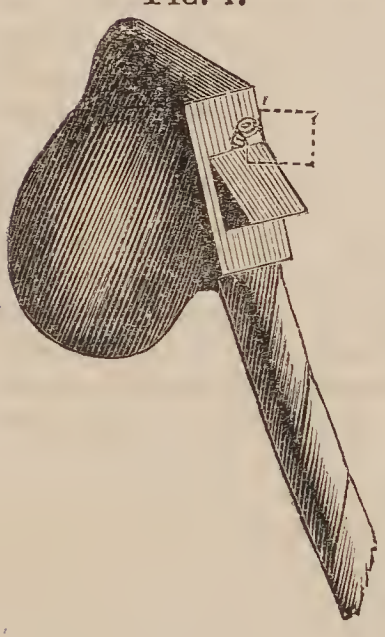
The fibres of the cerebro-spinal (peripheral and central) as well as of the *sympathetic nerves* of cold and warm blooded animals become, after two hours exposure to potash, finely granular, with uneven edges ; the sheaths are isolated and dissolved ; by an addition of water the fibres are dissolved, but each of them leaves behind a row of fat or soap globules, which are not dissolved by an excess of potash, and easily unite, so as to run together into larger globules. If they have first been digested with ether, every part is dissolved without leaving behind any fat globules.

The *ganglionic globules of the brain* resist the influence of potash for many hours, and also leave behind, when at last dissolved, fat globules. The walls of the peripheral ganglionic globules resist very long ; their contents, however, are dissolved by an addition of water, especially if they have run out, and leave scarcely any fat or soap-globules behind. These ganglionic globules appear to contain much less fat than the fibres of the nerves.

(*To be continued*).

DR. SNOW'S CHLOROFORM INHALER.

FIG. 1.



The dotted lines indicate the position of the expiratory valve, when turned aside for the admission of unvaporized air.

FIG. 1.—*The Inhaler enclosing the mouth and nose.*

FIG. 2.

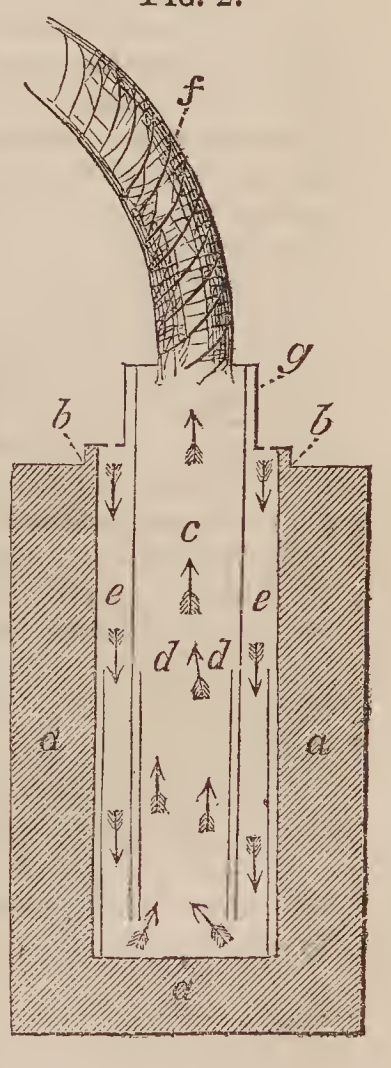


FIG. 2.—*Perpendicular section of Inhaler on a scale of one-half the dimensions.*

a a. Water-bath.

b b. Point at which the water-bath is screwed to the inhaler, and near which the inner cylinder is screwed to the outer one.

c. Inner cylinder.

d d. Point at which the inner cylinder terminates in wire, round which bibulous paper is coiled, the outer cylinder being lined with the same to this height.

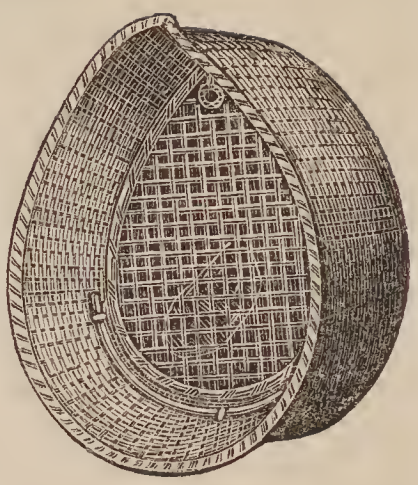
e e. Outer cylinder.

f. Elastic tube.

g. Screw attaching tube to apparatus.

CHLOROFORM INHALER.

J. BELL AND CO.



The drawing represents the inner view of this inhaler, which is a wicker basket made to fit the lower part of the face, and having a frame to confine the sponge in its place.

The chief advantage of this inhaler is its simplicity and economy.

ROYAL SOCIETY.

February 3. Professor Graham, Vice-President, in the Chair. A paper was read by Dr. Stenhouse, of Glasgow—

"*On the Proximate Principles of some of the Lichens.*" The paper commenced by stating that the author's attention had been called to the subject by Dr. Pereira about two years ago, from whom he obtained a specimen of Cape of Good Hope lichen, in which he discovered a new crystalline principle. By exhausting with lime, instead of boiling water, he has succeeded in obtaining several new principles from varieties of the lichens.

I. SOUTH AMERICAN VARIETY OF ROCELLA TINCTORIA.

The lichen was cut into small pieces, and macerated with a large quantity of water for some hours, then quick-lime was added. A yellow solution was obtained, from which muriatic acid precipitated the colouring matter as a bulky gelatinous mass. This was washed, dried on a plate of gypsum, and dissolved in hot spirit of wine (not boiling). The solution on cooling, deposited the colouring principle in small white prismatic needles, arranged as stars. This is,

1. *Alpha-orsellic acid* (hydrated) $C_{32}\ H_{15}\ O_{13} + H\ O$, and its salt of baryta, *alpha-orselliate of baryta* $C_{32}\ H_{15}\ O_{13} + Ba\ O$.

2. *Alpha-orsellesic acid* was obtained by mixing crude gelatinous orsellic acid with a little water, neutralizing with lime or baryta, and precipitating with muriatic acid. A gelatinous hydrate is obtained, which may be purified by solution in dilute alcohol and crystallization. The composition of this acid and its barytic salt, are as follows:—

Alpha-orsellesic acid.....$C_{16}\ H_8\ O_7 + H\ O$.

Alpha-orsellesiate of baryta ....$C_{16}\ H_8\ O_7 + Ba\ O$.

This acid gives a fugitive blueish-red or violet tint with hypochlorite of lime. Orsellic acid gives a deep blood-red tint, quickly changing to yellow.

3. *Orsellesic ether* $C_{16}\ H_8\ O_7 + C_4\ H_5\ O$, is obtained from alpha orsellic acid, by boiling in strong alcohol, evaporating to dryness, and dissolving in boiling water; it crystallizes on cooling in long flat needles, having a yellowish colour from adhering resin.

II. ROCELLA TINCTORIA FROM THE CAPE OF GOOD HOPE.

By processes similar to those just mentioned, this lichen yielded

1. *Beta-orsellic acid*.....$C_{34}\ H_{17}\ O_{14} + H\ O$.

Beta-orselliate of baryta.....$C_{34}\ H_{17}\ O_{14} + Ba\ O$.

2. *Beta-orsellesic acid* (formula to be given hereafter).

3. An ether compound, which is probably orsellesic ether. By three experiments, its composition was found to be

	I.	II.	III.
Carbon	60.82	60.75	60.83
Hydrogen	6.27	6 15	6.27
Oxygen	32.91	33.10	33.00
	100.00	100.00	100.00

4. *Rocellinin*, obtained by drying the gelatinous mass which is precipitated from the lime solution by muriatic acid, and boiling in strong spirit. The ether compound dissolves, and rocellinin remains behind. It is purified by repeated crystallization from strong spirit, aided by animal charcoal, and presents itself in soft hair-like crystals, about an inch long, arranged in stars. It is a very indifferent substance, appearing however to be a feeble acid. Its empyrical formula is $C_{38}\ H_{17}\ O_{15}$.

III. ROCELLA MONTAGNEI,

By similar treatment yielded:—

1. *Erythric acid*, $C_{20}\ H_{10}\ O_9 + H\ O$. This acid gives a blood-red colour with hypochlorite of lime.

2. *Erythric ether*, $C_{20}\ H_{10}\ O_9 + C_4\ H_5\ O$.

3. *Erythric methylic ether*, $C_{20}\ H_{10}\ O_9 + C_2\ H_3\ O$. This ether crystallizes in longer and narrower prisms than erythic ether.

4. *Erythrelesic acid* is analogous to Alpha and Beta--orsellesic acids.

5. *Picro-erythrin*.—By neutralizing erythric acid with lime or baryta, and throwing down erythrelesic acid with muriatic acid, a mother liquid is obtained, containing picro-erythrin, from which that substance may be separated in the form of yellowish crystals, and these may be purified and decolourized by repeated crystallization from hot water and the use of animal charcoal. Picro-erythrin gives a blood-red colour with hypochlorite of lime. Its empyrical formula is $C_{34}\ H_{24}\ O_{20}$.

6. *Pseudo-orcin*, of which the emperical formula is $C_{10}\ H_{13}\ O_{10}$. It is obtained by boiling the lime solution of R. montagnei till it is reduced to one quarter of its bulk, passing carbonic acid in excess through the liquid, and evaporating the filtered liquid to the consistence of a syrup: this is introduced into a flask and digested with a large quantity of ether, which dissolves orcin and leaves pseudo-orcin. On being crystallized two or three times from strong spirit, it is obtained in large shining colourless crystals. Still larger crystals may be obtained from an aqueous solution. Hypochlorite of lime has no action on it.

The author then gives a mode of extracting the colouring principles of the lichens, so as to make them portable for commercial purposes. The extraction might be performed in the countries where the lichens grow, by cutting them up into small pieces, macerating in milk of lime, neutralizing with muriatic or acetic acid, collecting the gelatinous precipitate on cloths, and drying it at a gentle heat.

He also suggests two modes of estimating the quantity of colouring matter in the lichens:—

1. By macerating a known quantity of the lichen in milk of lime, filtering and adding bleaching powder of known strength, from an

alkalimeter, till all colour disappears from the liquid, and noting the quantity of solution required. It is thus found that

Angola lichen requires	200	measures...	1.00
American "	120	"	0.60
Cape "	35	"	.17
Lecanora tartarea (from Germany, near Giessen)	25	"	.12

2. By extracting the lichen with milk of lime, precipitating with acetic acid, collecting the precipitate on a weighed filter, and drying and weighing it.

IV. EVERNIA PRUNASTRI.

1. *Evernic acid* is obtained by extracting the lichen with milk of lime, precipitating with muriatic acid, drying the precipitate and digesting it in weak spirit till nearly two-thirds are dissolved. The solution yields crystals of evernic acid: the insoluble part is *usnic acid*. Evernic acid yields only a slight yellow colour with hypochlorite of lime.

Formula of hydrated *evernic acid*.....$C_{34}\ H_{15}\ O_{13} + H\ O$
Everniate of potash .....$C_{34}\ H_{15}\ O_{13} + K\ O$
Everniate of baryta .....$C_{34}\ H_{15}\ O_{13} + Ba\ O + Aq.$

2. *Evernesic acid* is obtained by dissolving evernic acid in a slight excess of caustic potash, passing carbonic acid gas through the solution to saturation, and concentrating the solution: evernesiate of potash crystallizes. From this the acid may be separated by means of muriatic acid. It gives a yellow colour with hypochlorite of lime.

Formula of hydrated acid .....$C_{18}\ H_9\ O_7 + H\ O$
Evernesiate of baryta.....$C_{18}\ H_9\ O_7 + Ba\ O + Aq.$
Evernesiate of silver .....$C_{18}\ H_9\ O_7 + Ag\ O$

ORCIN.

This substance is always obtained when any of the colouring principles of the lichens which yield red dyes with ammonia are subjected to particular processes. The best way of obtaining it pure is to boil the alpha or beta-orsellesic acid or the erythrelesic acid, in water for about an hour. Carbonic acid is given off, and crystals of colourless orcin are deposited. It gives a dark purple red colour with hypochlorite of lime, quickly changing into deep yellow.

Empirical Formula.....$C_{16}\ H_{11}\ O_7$

Brom-orceide $C_{66}\ H_{24}\ Br\ O_{13}$ (emp.), is obtained by pouring bromine into a concentrated aqueous solution of orcin. When pure it forms long white adhering needles; it has no taste or smell.

Chlor-orceide. A similar compound is obtained by passing chlorine gas through a solution of orcin.

USNIC ACID.

This principle is found in *Usnea florida, U. hirta, U. plicata, U. barbata, Ramalina calicaris, R. fraxinia, Evernia prunastri*, and *Cladonia rangiferina*. It is best obtained from *Cladonia rangiferina* and *Usnea florida*, by the use of lime and muriatic acid. Its empirical formula is $C_{38}\ H_{17}\ O_{14}$.

CHEMICAL SOCIETY

January 17.—The President in the chair. The following papers were read:—

"*On Hyposulphathylic, Hyposulphamethylic, Bisulphithylic,* and *Bisulphimethylic Acids, produced by the action of Nitric Acid on the Sulphocyanides and Bisulphides of Ethyl and Methyl,*" by J. S. Muspratt, Ph. D. The author details the preparation of the sulphocyanides of ethyl and methyl by the action of equal measures of the strong solution of sulphocyanide of potassium on the solution of the respective lime salts of sulphate of ethyl and methyl, with the subsequent action of nitric acid, and of the mixture of chlorate of potash and hydrochloric acid, both on these compounds and on the bisulphides of ethyl and methyl. Their purification and the analysis of their respective salts of baryta, lead, and copper, are then given. The composition of the baryta salts is as follows:—

Bisulphithylate of Baryta	$C_4 H_5 S_2 O_4$,	Ba O+Aq.	
Hyposulphathylate	$C_4 H_5 S_2 O_5$,	"	"
Bisulphimethylate	$C_2 H_3 S_2 O_4$,	"	"
Hyposulphamethylate	$C_2 H_3 S_2 O_5$,	"	"

"*On the Quantitative estimation of Phosphoric Acid, and on its Presence in some of the Marls of the upper Green Sand formation,*" by J. C. Nisbett, Esq. In the examination of the marls in question for phosphoric acid, the author adopted the method proposed by Fresenius, as the most accurate known, founded on the solubility of the double tartrate of iron and alumina in a liquid containing an excess of ammonia, and on the insolubility of the phosphate of magnesia and ammonia in the same medium; but finding that it was liable to yield erroneous results, experiments were instituted to ascertain the cause; and Mr. Nesbitt states that the solution should not be too concentrated, but of a light straw colour, that the tartaric acid is preferable in rather large quantity, and the ammonia also in considerable excess; the precipitate should be crystalline, and neither flocculent nor gelatinous, and that, if there should be any doubt as to the purity of the precipitate, it should be re-dissolved while in the hydrated state, a little tartaric acid added, and again precipitated by ammonia. By adopting these precautions, Mr. Nesbitt separated from this marl 2.31 per cent. of phosphoric acid, equivalent to 4.75 of bone phosphate.

"*On the Constitution of the Phosphates of the Organic Alkalies,*" by Thomas Anderson, M.D. After alluding to the labours of Regnault and Nicholson on this subject, the author proceeds to detail his own investigations and results. The salts analysed, and the formulæ derived, are as follows:—

Phosphate of Strychnia, monobasic		$(C_{44} H_{23} N_2 O_4 HO) HO, PO_5$
" " bibasic	2	$(C_{44} H_{23} N_2 O_4 HO) HO, PO_5 + 18 HO$
" Brucia, bibasic	2	$(C_{44} H_{25} N_2 O_7 HO) HO, PO_5$
" Quina, bibasic	3	$(C_{20} H_{12} N O_2 HO) PO_5 + 6 HO$
" Dry Salt	3	$(C_{20} H_{12} N O_2 HO) PO_5$

"These," Dr. Anderson continues, "are sufficient to establish satisfactorily the general constitution of the phosphates of the organic alkalies, and to show that they agree with the inorganic salts of that acid. Quina, which replaces three equivalents of basic water, may be compared to oxide of lead. Brucia, may represent the inorganic alkalies, which replace two equivalents, while strychnia, which, under

ordinary circumstances, replaces only a single equivalent of water, belongs to a class which has no analogue among the series of inorganic bases."

February 7, 1848—The President in the chair. The following papers were read :—

"*On the Composition and Distribution of the Inorganic Substances in the different Organs and component Organic Parts of the Mulberry Tree*," by John T. Herapath. The author observes, that, in all ash analyses hitherto made, the whole or the entire part of the plant has been taken for investigation, although these consist of at least three distinct constituent parts, the cellulose, the incrusting matter, and the fluid contents of the cells, which occur in every variable proportion, and contain their peculiar inorganic substances. When an ash analysis is made, we, therefore, merely ascertain the composition of the mixed ashes of these different parts, but we do not determine either the proportion or the composition of them individually. The subject of this communication was undertaken to exhibit these points. The plan adopted for the preparation of the ash of the entire organs, and the component parts of these organs, with the method of analysis, are given in detail, and the results exhibited in a series of tables, showing the vast difference in the proportion of ash yielded by the various organs and their component parts, the sap giving a much larger quantity than the woody matter, the ash of the former being composed also of more than one-half alkaline salts, while the latter consisted almost entirely of insoluble earthy salts. Although Mr. Herapath admits that many of these analyses are imperfect, owing to the difficulty of purifying these substances prior to burning, yet he concludes they clearly demonstrate that inorganic substances do sometimes exist in actual combination with the elementary tissues of plants. It still remains, however, for future experimenters to prove whether such be always the case; and if so, whether they obey any fixed and general laws.

"*Analysis of the Water of the Artesian Wells, Trafalgar Square*," by Messrs. F. A. Able and Robert H. Rowney. After detailing the precautions taken in the examination of this water, and the method of analysis adopted, the authors give the following results in the imperial gallon : carbonate of lime, 3.255000—phosphate of lime, 0.034041—carbonate of magnesia, 2.254000—sulphate of potash, 13.671000—sulphate of soda, 8.749300—chloride of sodium, 20.058500—phosphate of soda, 0.291000—carbonate of soda, 18.048800—silicic acid, 0.971000—apocrenic acid, 0.098700—crenic acid, 0.137200—extractive matter, 0.6720000=68.240541 grains. It contains also 8,825 cubic inches of carbonic acid gas, at 58° Fah. in the imperial gallon.

"*On the Products of the Action of Potassium upon Cyanide of Ethyl*," by Dr. H. Kolbe and Mr. E. Frankland. The authors found that when cyanide of ethyl was allowed to fall in drops upon small pieces of potassium a violent action ensued, attended with the formation of an inflammable gas, having the specific gravity 1.075, and the composition and condensation of the hitherto hypothetical radicle methyl, the potassium being at the same time converted into a tenacious yellow mass. Methyl is a colourless gas, incondensable by a temperature of —18° C., insoluble in water, and possessing a slight ethereal odour. Concentrated sulphuric acid has no action on it, nor

does it combine with sulphur or iodine when heated in the gas. Mixed with an equal volume of dry chlorine, and exposed to diffused daylight, the gases rapidly combined, forming one volume of hydrochloric acid, and one volume of a gas which must be composed of half a volume of chlorine and one volume methyl minus half a volume of hydrogen, and its specific gravity 2.226 This is the composition and condensation of chloride of ethyl; yet it does not appear to be that body, but an isomeric compound.

When the yellow tenacious mass is mixed with water, a large quantity of cyanide of potassium dissolves, leaving a white substance almost insoluble in cold, but soluble in hot, water, from which it separates in shining crystalline scales, having the per centage composition of cyanide of ethyl; yet that substance does not agree in any of the properties of this compound. It exhibits all the characters of an organic base, and the authors have named it Cyanethine; its rational formula is C_{18} H_{15} N_3. It is a white volatile substance, almost tasteless and inodorous; it melts at 190° C., and boils at 280° C. The solution in warm water shows a distinctly alkaline reaction.

ROYAL INSTITUTION.

On Tuesday evening, Jan. 28, Professor Brande delivered a lecture on the Chemical Properties of Ether and Chloroform, and the Physiological Effects of the Vapours of those Anæsthenic Agents. Having given a concise historical account of the subject (with which our readers are familiar) the lecturer adverted to the question which had been raised, whether sensibility was actually annihilated by the inhalation of those vapours, or whether the patients suffered pain but had no recollection of it afterwards. The latter supposition had been apparently supported by the fact, that in many cases the patients appear during the operation to be suffering pain, denoted by groans and contortions of the limbs, although they afterwards declare that they were not sensible. The Professor, while admitting the importance of this inquiry in a metaphysical point of view, dismissed it without giving any positive opinion.

At the close of the lecture a guinea-pig was introduced, and the lecturer described the four degrees of anæsthetic effect, which take place during the progress of inhalation when carried to the full extent, observing, that the animal would pass successively into each of these states, and that on withdrawing the stimulus, he would relapse by the same steps to a state of consciousness. The guinea-pig being placed under a bell glass on a tray, about a drachm of chloroform was poured in, and the insensibility occurred as predicted, but without any very distinct demarcation between the four states alluded to. On removing the glass the return to sensibility did not take place, the animal being dead.

This accident may be attributed to the fact that the edges of the tray confined the heavy vapour of the chloroform, in which the nose of the guinea-pig was immersed, even after the removal of the glass and during the time that free access of pure air should have been allowed.

It had been announced that on *Friday*, the 11th of *February*, Mr. Apsley Pellatt would give a practical illustration of some of the processes connected with the manufacture of ornamental glass, for which purpose a temporary furnace was erected in the theatre of the

institution; but just before the hour of meeting, it was found that the intense heat of the fire had carbonized some of the timbers beneath the stone floor on which the furnace was fixed, so that it was necessary immediately to extinguish the fire, and postpone the lecture to the following week.

Friday, February 18. It having been deemed expedient not again to attempt the practical illustrations, from the difficulty of obtaining the requisite heat without danger to the building, Mr. Pellatt on this occasion occupied the accustomed hour in stating some interesting facts connected with the manufacture of ancient and modern ornamental glass, merely illustrating his remarks by reference to specimens and drawings. He divided the different kinds of glass into two classes, which he distinguished as *simple* and *compound*—the "simple" consisting of those kinds which are composed merely of sand or silica and an alkali, and the "compound," of those which contain metallic oxides in addition. The ancients made both these kinds of glass, their colourless glass belonging generally to the simple kind, as they appear rarely to have used lead. Simple glass, however, is more liable to undergo decomposition than compound glass, and most specimens of ancient colourless glass afford evidence of this. The presence of metallic oxides exercises a conservative influence. But while the addition in suitable proportions of metallic oxides, renders the combination more permanent, it is important to avoid using them in excess. The quality of the glass will depend greatly upon the due adjustment of the proportions of the ingredients. Excess of alkali frequently renders the glass rotten, and it ultimately undergoes a kind of efflorescence. This was illustrated in the case of some glass which had been coloured with uranium. In using the oxide of this metal, it is found that the brilliancy of the colour is increased by having a larger quantity than usual of alkali present, but in the instance referred to, such an addition having been made, the glass, after some time, became opaque and rotten. Perfectly transparent glass sometimes becomes opaque from very slow cooling; the glass in these cases, passing from the true vitreous to the crystalline condition. When this effect takes place in the process of annealing, as it sometimes does, it can be remedied by again exposing the glass to a very high temperature. The arrangements of the annealing oven were explained, and the importance of this process in producing good and useful glass, pointed out. Glass, when duly annealed, undergoes a greater amount of contraction than it would if cooled suddenly. A tube of forty inches in length undergoes contraction to the extent of about a quarter of an inch, if properly annealed, but the contraction would be only to half this extent if it were suddenly cooled.

In reference to coloured glasses, it was stated, that the ancients obtained a very good red glass by the use of iron as the colouring agent, but the process by which this effect was produced is not now known, and, although some bright red specks sometimes occur accidentally in the green bottle glass, which owes its colour to the presence of iron, yet the manufacturer is obliged to resort to the use of much more expensive ingredients in making red glass.

A description was given of the method of making the beautiful Venetian glass, called *Vitro di trino*, and *frosted glass*. The peculiar appearance of the latter was said to be given to it by dipping the glass,

during the process of blowing, and while still soft, into cold water; then again softening it in the furnace, and after each repetition of the softening and blowing, dipping it into water as before.

The methods of enclosing cameos in glass, of stamping impressions on the surface, so as to retain the sharpness and perfection of engraving, and of producing the appearance of mosaic work in the interior of the glass, were also described.

At the conclusion of the lecture, Professor Faraday made some remarks with the view of explaining a phenomenon which had been observed on the previous Friday evening in connexion with the fire. The furnace intended for melting the glass had been fixed on the hearth-stone of the lecture-room. This stone is about three inches thick, and is placed on a bed of mortar of about the same thickness, over the timbers of the floor of the room. There is then a space of about two feet between the lower surface of the hearth-stone, and the ceiling of the room below. A hole having been cut in the floor to enable a man to get access to this space, so as to throw water on to the smouldering wood, while at the same time water was being thrown on to the fire above, some of which had fallen through the bars and rested on the hearth-stone, flashes of fire were observed to dart downwards from the under surface of the hearth-stone. This was the phenomenon of which Professor Faraday wished to offer an explanation. What was the cause of these flashes of fire? He conceived that they originated in the following manner:—part of the water thrown on to the fire which rested on the hearth-stone was decomposed, and its hydrogen forced downwards through the porous stone, and ignited in the space beneath. Some persons, he said, might be incredulous as to the possibility of inflammable gas taking fire when exposed to a temperature no higher than that of the space in which these flashes of fire had been seen, but to show that the opinion commonly entertained with reference to the temperature necessary for the ignition of inflammable gas was questionable, he performed an experiment, which consisted in directing a jet of gas into the heated air issuing from the chimney of an ignited gas lamp. The jet of gas under these circumstances ignited, although it was many inches above the flame of the lamp, and not directly over it; and it was shown, that in the spot where the ignition of the gas took place, the heat was not sufficient to ignite paper, or to burn the hand if held there for some seconds.

This statement appears to involve two problems, both of which we think require some further explanation. First, by what force, agency, or chemical process did the hydrogen of the water penetrate the hearth-stone, while its oxygen was consumed above? Secondly, under the supposition that the hydrogen did thus accumulate beneath the stone, at what temperature did ignition actually take place?

At the general meeting of the members on the 7th of February, Mr. Hellyer did not come forward with the extraordinary proposition, of which he had given notice, as quoted in our last number, but he substituted a resolution occupying about a page of foolscap, the object of which appeared to be to obtain the privilege of a nocturnal ramble over the minute-books of the Institution, for the purpose of preparing a brief for a future meeting, which his avocations prevented his doing during the hours of business. The resolution was seconded and thrown out. Mr. Hellyer's extraordinary proposition was then adopted by another member, and having been seconded, was disposed of in the same manner. Notwithstanding these strenuous efforts, harmony was preserved, and the meeting ended pleasantly.

CLARK *v.* FREEMAN.

ROLLS COURT, JANUARY 31, 1848.

Motion for an injunction made by Sir James Clark, Bart., to restrain the use of his name in connexion with the sale of a quack medicine.

CLARK *v.* FREEMAN.—Mr. Turner (with whom was Mr. Wickens) moved in this case, on behalf of the plaintiff, Sir James Clark, Bart., physician in ordinary to the Queen, to restrain the defendant, Richard Freeman, a chemist, living at 5, Clayton Place, Kennington Road, from selling or offering for sale some pills, of which he was the manufacturer, in such manner as to represent them to be the pills of the plaintiff, and from holding himself out to be the agent of the plaintiff for the sale of the pills. It appeared that the defendant manufactured the pills in question for the cure of consumption and other pulmonary complaints; and, to puff them off, he published advertisements and circulated hand-bills so worded as to lead the public to suppose they were the pills of Sir James Clark, who enjoys a great reputation in pulmonary disorders, having written some treatises on the subject. One of the advertisements was headed—"By her Majesty's permission, Sir J. Clark's Consumptive Pills, a certain cure for Consumption, and an unfailing remedy for Coughs, Asthma, difficulty of breathing," &c.; and then followed a dissertation on pulmonary disorders, and an eulogy of the pills, and at the foot, "Agent, Mr. R. Freeman, Kennington Road, and to be had of any medicine vendor. 2*s.* 9*d.*" There was also a representation of the royal arms after the words, "Her Majesty's permission." Another advertisement was in the form of an apology to the medical profession for selling a patent medicine. The defendant had spelt the name of Clarke with an *e* at the end; but the intention appeared to be to induce the public to believe that the pills were manufactured and sold under the direction of Sir James Clark. In support of the application, an affidavit of the plaintiff was read, in which he stated that he had caused the pills to be analyzed, and had found that they contained antimony and mercury, which were very injurious in many cases of of consumption. He had received several letters from parties in the country, some asking him how they were to use the pills, and others complaining of the ill consequences which had followed from the use of them. It was contended that as it was not only a gross imposition on the public to represent the pills as the plaintiff's, but as it would also tend to injure the reputation and practice of the plaintiff, the Court ought to interfere by injunction. The defendant had no right to use the plaintiff's name to enhance the value of his own wares, or to hold himself out as the agent of the plaintiff in the sale of a quack medicine. The conduct of the defendant gave the plaintiff a right of action against him, and where damages were recoverable in an action at law, the court would grant an injunction. In the case of "Lord Byron *v.* Johnston" (2 Meriv., 29), Lord Eldon granted an injunction to restrain the defendant from selling some poems as Lord Byron's which were sworn not to be his; and so here the Court ought to restrain the defendant for selling pills as the plaintiff's which were not his.—The Master of the Rolls thought he had not jurisdiction to interfere. There could not, he said, be any injury to property so as to induce the Court to interfere. An attempt to impute to Sir James Clark that he had anything to do with a quack medicine was perhaps defamatory to his character, but he could not imagine that a person in his position could be seriously injured by it. It was one of the taxes imposed on eminent men to have their names thus made use of. No doubt, also, an attempt to connect Sir James Clark with a quack medicine was a great injury to the public, who were induced to adopt remedies which were highly prejudicial. But this was in the nature of a public offence; and Lord Byron's case differed from the present in this respect, that Lord Byron was in the habit

of writing and publishing poems ; but Sir James Clark was not in the habit of making and selling pills. He could not, therefore, be said to be injured in his trade or business by what was done by the defendant. He must refuse the application.

ADVERTISEMENT OF THE VENDOR OF THE QUACK MEDICINE.

"By Majesty the Queen's Permission. Sir J. Clarke's Consumption Pills.—I am fully aware, that by introducing this cure for consumption as a patent medicine it will create some astonishment in the minds of the profession ; but it is only by having recourse to such means that the knowledge of this discovery can be disseminated amongst those unfortunate persons whom it has been my great aim to relieve. It has long been a source of regret to me, that consumption should be making such an alarming progress—at least one-fifth of the population die from diseased lungs, and this, too, in the nineteenth century, when medical skill is pronounced to be greater than ever ; yet not alone must the faculty bear the blame—the patients themselves are generally the last to see their danger ; consequently tubercles are formed in the lungs. These, uniting, produce an abscess ; and as all this takes place without causing much pain, the patient unconsciously allows himself to be brought from one stage of the disease to another, till his case at last is beyond the skill of his medical attendant ; and thus perish thousands every year.

"Pulmonary consumption is to be attributed to various causes—such as want of proper exercise in the open air, improper food, scarcity of clothing, breathing an impure atmosphere, want of cleanliness, also too intense application to study or business—all these things, singly or conjointly, predispose the body to disease, and hence arise tuberculated lungs. The tubercular diathesis being once formed, requires very little to call it forth ; it will develop itself on an occurrence of fever, exposure to cold, the abuse of spirituous liquors, and sudden transition from heat to cold, or by an attack of bronchitis or pleurisy. The usual symptoms are, a feeling of tightness across the chest, with great internal heat, accompanied by a short, tickling cough, excessive languor, and a sense of uneasiness in the chest, if the patient exerts himself too much, he becomes thin, emaciated, and exceedingly irritable. At length a bloody tinge of the sputa or hæmoptysis, as it is termed, proves, beyond all doubt, the patient to be in the first stage of the disease. The spitting of blood recurs at irregular intervals, and varying in quantity; gradually the cough becomes worse, especially at night ; a pain is felt in the pit of the stomach, and also in the throat ; respiration is quick, and the patient totally unable to expand the chest ; then follow purulent expectoration and hectic fever. These, with colliquatic sweats, form the striking features of consumption, apparent to every one but the patient himself, who shows a remarkable aptness to find excuses for all. Now, it is in removing all these fearful symptoms that I have been so successful, and it is hoped that every individual—more especially young persons—will ask themselves the question, if whether or not they are affected by the symptoms that are herein enumerated ? If so, however great their fears may be on the subject, let them lose no time in availing themselves of the cure that has been found for them.

"In cases of chronic bronchitis or asthma, this medicine is equally efficacious. E. R.

"Sole wholesale agent, Mr. Richard Freeman, No. 5, Clayton Place, Kennington Road, London ; and can be had of any dealer in patent medicines in the kingdom. Price 2*s.* 9*d.* a box, duty included."

VERDICT OF MANSLAUGHTER AGAINST A QUACK.

On Friday, the 21st of January, an inquiry before J. Barnett, Esq., coroner for West Glouecstershire, touching the death of James Fox, was resumed, after the exhumation of the body. It was proved that the deceased had suffered from a tumour in his thigh ; and that he had been last treated by a person named John Ravenhill, farmer and horse-doctor, who caused plasters to be applied to the part diseased. The effect of these plasters was continued sloughing, followed by violent hæmorrhage, and death soon afterwards. Mr. Ravenhill, having originally been summoned as a witness, was offered the opportunity of saying anything that he might deem proper. He, however, declined to do so, but handed in letters, some addressed to the Coroner, and others to himself, referring to other cases, it was supposed. He was told these were not admissible as evidence in the case then under the consideration of the Jury, who, after hearing the Coroner's summing up, were some hours in deliberation on their verdict. This was afterwards announced to be "*Manslaughter against John Ravenhill,*" who they considered criminally culpable, for prescribing and applying the strong caustic plasters to the tumour on deceased's thigh, which occasioned sloughing, hæmorrhage, and death. He therefore stood committed to take his trial on the charge of manslaughter. The deceased's widow, in reply to a question, told the Coroner she considered her husband died entirely "through natural causes!" This, she was told was totally at variance with the evidence of the three medical gentlemen, the appearance in the *post mortem* examination of the body, and the facts elicited in the examination of herself and other witnesses; and quite contrary to the verdict of sixteen respectable neighbours, who, as jurors, had given the case that patient, calm, and careful consideration its importance required.

The Coroner then suitably addressed Ravenhill, referring to some of the leading features of the case—the responsible position in which he had placed himself by taking upon him the cure of a tumour for £5 (£3. 5*s.* of which he had actually received, and had not yet returned one farthing), which a Member of the Royal College of Surgeons had attended and prescribed for without any charge to the deceased ; but whose recommendations had been resisted in order to seek his (Ravenhill's) more distant and precarious advice and treatment. The verdict of the jury left him only one course to pursue, that of committing him to gaol on the charge of manslaughter, against which he might, perhaps, have the opportunity of making a successful defence.

The prisoner applied to be admitted to bail, but was informed that this could only be granted by the superior court, the Queen's Bench.—*Hereford Journal, Feb. 2d.*

FURTHER PROSECUTIONS UNDER THE MEDICINE STAMP ACT.

Our object in giving a full explanation of the terms and spirit of the Medicine Stamp Act, was to caution our Members against the inadvertent infraction of the law, a casualty which sometimes brings down penalties on persons who had no intention of violating its provisions. We regret to learn that this warning has been overlooked by many of our Members, and that numerous informations have been issued in consequence.

The following is a report of a meeting held at Nottingham, Feb. 22, 1848 :—

At a meeting of the Chemists and Druggists (specially convened), the following resolutions were unanimously agreed to :—

"That this meeting regrets to learn that informations have been laid against several respectable members of their body (who have been threat-

ened with Exchequer process) for alleged infringements of the Medicine Act.

"That the articles upon which the information has been laid are such as have been tolerated from time immemorial, and were not known to come within the meaning of the Act.

"That this meeting disclaims any intention of fraud on the revenue. They therefore confidently hope that the Commissioners of Stamps and Taxes will forego the threatened penalties, and furnish them with a clear statement of the requirements of the Medicine Act for their future guidance.

"That a copy of these resolutions be sent to the Board of Stamps and Taxes, and the Pharmaceutical Society."

Signed by John Hedderly, chairman, and twenty-five Druggists who were present.

On receipt of the above information, with other communications of a similar nature, we proceeded to make the needful inquiries at Somerset House, where we found the particulars of each case recorded, and the grounds of the informations were explained. None of the cases contained any new feature or doubtful point, being simply medicines sold, with recommendations for some specified disorder, without stamps. The ground of the liability is clearly explained in our number for February, vol. vii., page 361, to which we beg to refer our readers, advising those who have not paid attention to the subject to make themselves acquainted with the facts. So long as the law continues in force, it is the best economy to comply with its demands to the letter, and it is no less unsafe than discreditable to make any distinction in this respect between strangers and regular customers. Whatever is liable to the stamp should never be sold without it, and any medicine which is or ever has been sold with printed directions recommending it as a nostrum or proprietory medicine, or as beneficial for the cure, &c., of any disorder, is liable to the stamp. It is of no consequence whether the printed bill be furnished with the medicine on each occasion or not. If a bill can be produced which is sometimes appended to it, the existence of that recommendatory bill makes the medicine liable. In the cases in which the Board have lately proceeded, the medicine has been sold with the bills, or with labels having the same purport.

In the interpretation of the law some indulgence is allowed; for instance, a medicine may be designated by a distinctive name, as "Cough Mixture," "Antibilious Pills," "Gout Cordial," &c. This is necessary, in order that the public may not confound one medicine with another. Consequently the Board does not interfere with these cases, although the strict letter of the law would include them; but if to this distinctive title be added any specific recommendation, or if the article be described as a nostrum, or secret preparation, or as made only by any particular person—then, in any of these cases, the stamp duty would be enforced. The Board have also waived the powers of the Act in reference to those doubtful cases alluded to in page 363, which are more allied to perfumery than to medicine.

But we are informed, that if unfair advantage were to be taken of any such leniency, on the part of the Board, in the interpretation of the letter of the law, so as to lead to an evasion of its spirit, the Board would act as might seem advisable in accordance with the power it possesses. From the full investigation which we have given to the

subject, we think there is no disposition on the part of the authorities to take proceedings in any doubtful cases. In cases which are clearly within the meaning and intention of the Act there is no alternative, but to submit or incur the liability.

NOTICES OF BOOKS.

A Manual of Pharmacy for the Student in Veterinary Medicine; *containing the Substances employed at the Royal Veterinary College, with an Attempt at their Classification, and the Pharmacopœia of that Institution.* By W. J. F. Morton, Lecturer on Veterinary Materia Medica. Fourth Edition. Longman & Co. Small 8vo, pp. 374.

We have already noticed former editions of this work, and recommended it as a valuable addition to the library of the Pharmaceutical Chemist, who, although not a veterinary practitioner, is frequently called upon to supply horse and cattle medicines. The therapeutic action of medicines on animals is not understood by the majority of those who dabble in this kind of practice, and mischief is sometimes done by grooms and other uneducated persons with their private recipes, which are handed down by tradition as heir-looms from one generation to another, and administered empirically without caution or judgment.

The well-informed Chemist, who furnishes the materials for this amateur practice, has frequently an opportunity of preventing unnecessary torture, or even saving life, by giving suitable precautions respecting the use of powerful or dangerous medicines. In fact, we think it is his duty to exercise a watchful care in this respect, for if it could be proved that he had prepared a ball which occasioned the death of a horse, and which from its composition might be expected to produce such a result, the authority of the groom who brought the recipe to be prepared would not be a satisfactory extenuation. In the event of any legal inquiry in such a case, the Chemist would be blamed, if not held responsible for furnishing a poisonous dose to an ignorant person without due precaution. A few weeks ago a correspondent brought to our notice a case of this kind, a mass of balls having been ordered containing a dose which was obviously so unsafe that we advised him to decline the responsibility of preparing it.

In order to obtain the requisite information respecting the doses and action of horse medicines, a work like the one before us is of great value, and every Chemist should have within his reach the means of reference in case of doubt in his own mind, or when inquiries are made on the subject.

We believe the Pharmacopœia equina of Mr. Bracey Clarke, which was published many years ago, was the first veterinary Pharmacopœia worthy of being quoted as an authority, and we have often recommended this work as possessing the merit of originality, simplicity, and practical usefulness.

Mr. Morton's *Manual of Pharmacy* bears the same relation to the above that a Dispensatory does to the Pharmacopœia. It contains a concise history of the substances employed, their chemical composition, mode of exhibition, dose, properties, and effects. It contains a table in which the various remedies are classified, and a paralogical table for general reference, while particular instructions respecting each remedy are given in the body of the work.

Among other subjects interesting to the Chemist we may notice Mr. Morton's test for arsenic, in which a jet of arsenuretted hydrogen, as suggested by Mr. Marsh, is obtained by means of galvanism, which obviates the disadvantage arising from the use of zinc and sulphuric acid, agents not unfrequently contaminated with the poison in question.

SANITARY REFORM *and Agricultural Improvement, or how to promote Health and Abundance.* In Three Letters. By CHARLES F. ELLERMAN, Esq. Letter I.—*Drainage, Sewerage, Urinariæ, and Cloacæ.* London: Price and Hyde, 310, Strand. 8vo, pp. 70.

THE WHOLE ART OF MAKING BRITISH WINES, *Cordials, and Liqueurs, in the greatest Perfection; also strong and cordial Waters, with a Collection of valuable Recipes for brewing fine and strong Welsh Ales, and miscellaneous Articles connected with the practice.* By JAMES ROBINSON. London: Longman & Co. Small 8vo, pp. 275.

THE MICROSCOPIC ANATOMY OF THE HUMAN BODY IN HEALTH AND DISEASE; *with numerous Drawings in Colour.* By ARTHUR HILL HASSELL. Part XII. London: Samuel Highley.

TO CORRESPONDENTS.

"*Palmer* v. *Radley*."—In alluding to this case last month, page 407, we were in error in stating that the case was dismissed. We have subsequently been informed that the defendant pleaded guilty to the charge of having written certain libellous letters.

The Benevolent Fund Dinner.—We are unable to publish an official report of arrangements, the list of stewards not yet being complete. The number already on the list exceeds forty, but a considerable addition is expected, and we are glad to find that our members, both wholesale and retail, are coming forward warmly in the cause. We take this opportunity of stating that the remark in our last number respecting the room was merely intended to bring to a conclusion a matter which had been the subject of conversation for a long time, and in coupling with the proposition the name of the gentleman who originally suggested it at a meeting of the members, the Editor alone is responsible, having trusted to his memory in repeating what had passed on the subject, and which, it would appear, was not correctly understood.

"*Antihumbug*" complains of the introduction of Sir James Murray's paper on Fluid Magnesia at a Pharmaceutical Meeting, on the ground that it is a proprietory, or as he terms it, a quack medicine.—[The objection might have been well founded if Sir James Murray had concealed the formula for his preparation; but on the contrary, he gave explicit instructions on the subject, thus enabling any Chemist to prepare it himself if he think proper. If Mr. Battley would act in a similar manner, he would be worthy of a laurel.]

J. C. W.—(1). We have had no practical experience in the purification of spermaceti.—(2). Dr. Pereira's *Materia Medica* is published by Longman and Co., to whom application might be made respecting the forthcoming edition.

X. L.—(1). We are not acquainted with any satisfactory chemical test for medicinal pyroxylic spirit.—(2). *Tartrate of lead:* Add solution of tartaric acid to solution of acetate of lead, as long as a white precipitate is formed.

Extractum Colchici Acet.—We have received a letter from Mr. Taylor, and another from Mr. Fordred, on this subject. We think the essential points in reference to it have already been published, and doubt whether any advantage would result from further discussion.

A. Z.—(1). No.—(2). Mellago Taraxaci is a fluid extract of taraxacum. —(3). A very good formula.—(4). The process of percolation is especially adapted for essence of ginger, although it may be made in other ways.

A. P. S.—We have not seen any scientific explanation of the phenomenon alluded to.

M.P.S., No. 2123—(1). A blue colour is given to the surface of polished steel by heating it. The colour is occasioned by a film of oxide on the surface.—(2). When a mixture of chlorate of potash and binoxide of manganese is heated for obtaining oxygen gas, the oxygen of the chloric acid and of the potash is set free, chloride of potassium being formed. The oxide of manganese undergoes no change, but promotes the decomposition of the salt by its presence.—(3). The bumping in distilling hydrocyanic acid, is occasioned by the sudden and unequal disengagement of vapour from the liquid. —(4). The samples viewed under the microscope, present the characters of genuine arrow-root.

"*A Dispenser.*"—The Pharmacopœia being the only authorized standard of the strength of the preparations used in dispensing prescriptions, it would be obviously incorrect to depart from this standard, unless specific instructions were given either verbally or in the prescription.

M. P. S.—(1.) Chloride of bromine is made by passing chlorine gas through bromine, and collecting and condensing the gaseous product.—(2.) Bronze powders are made in a variety of ways for different purposes: there are no published processes that can be depended on.

A. P. S. (*Manchester*).—It is cascarilla, but not of good quality.

J. W.—The crystals in the sample of old extract of sarsaparilla consist of chloride of potassium, a salt not unfrequently found in similar extracts.

A. P. S. (*Camberwell*).—In the answer alluded to in our last number, "perchloride" should have been "terchloride." This was a typographical error. Terchloride of carbon is the name given some time ago by Mr. Tuson to a solution of chloroform in spirit, to which we referred. We admit that the name is not correct, inasmuch as it does not describe correctly the composition; but while a compound is known and prescribed by any particular name, we cannot avoid using it.

Spes should send his name and address. Some of his questions are not suitable for a journal.

"*Niger.*"—(1.) Probably lamp-black and asphaltum would answer the purpose.—(2.) See vol. vii., p. 297.

H. T., M.P.S.—Dr. Ure describes the manufacture of gas in his *Dictionary of Arts and Manufactures.*

"*P.*"—See vol. vii., no. 7.

J. B., Kent.—We are not acquainted with a Botanical Pronouncing Dictionary.

"*Pythagoras.*"—See vol. vii., page 297. No person can be admitted as an Associate without passing the examination. Application should be made to the Secretary.

W. K. K., Liverpool.—We appreciate the communication which confirms our previous opinion.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. X.—APRIL 1st, 1848.

THE PRESENT STATE OF THE MEDICAL REFORM QUESTION.

The Medical Reform Question may be said to have two strings to its bow, each of which is in a state of tension, and preparing to send forth a shaft in the form of a Medical Bill, for the settlement of all existing abuses or differences in the profession.

Mr. Wakley's Medical Registration Committee is re-organized,* and has resumed its labours. We have before us a portion of the evidence which was collected chiefly at the close of the last parliament, and, judging from the specimen already published, there is reason to believe that the subject will be sifted completely, and in a business-like manner, (with one exception to be noticed presently). Mr. Wakley has the advantage of the experience of several predecessors in the cause, some of whom are among his coadjutors on the present occasion, and, by avoiding the shoals and quicksands on which former schemes have been wrecked, he may, if supported by the profession, steer at last the vessel into port.

While Medical Reform is engaging the attention of honourable Members in the House, the pressure from without is giving an additional stimulus to their proceedings, and investing the subject with increased public interest.

The existing medical bodies having objected to some of the provisions of Mr. Wakley's Medical Registration Bill published last year, and, desiring to obtain the introduction of such modifications as may in their opinion seem desirable, have adopted a course from which we trust advantage will arise. Some of the representatives of the Colleges of Physicians and Surgeons, and of the Society of Apothecaries, have met in conference, for the purpose of discussing those points on which differences of opinion have existed, and in the hope of being able to arrive at an arrangement satisfactory to all parties, as the basis of the new measure.

The result of this Conference has been the publication of a proposition, consisting of twenty-four clauses, the substance of which we shall condense into a small compass.

It is proposed that a charter of incorporation should be granted

* The Members of the Committee are, Mr. Wakley, Sir James Graham, Mr. Rutherford, Mr. George Hamilton, Lord Robert Grosvenor, Sir Henry Halford, Colonel Mure, Sir Robert Harry Inglis, Mr. M'Gregor, Mr. Walter, Mr. Trench, Sir Thomas Birch, Mr. Osborne, Mr. William Lascelles, and Mr. Grogan.

to the Surgeon-Apothecaries of this country, under the title of The Royal College of General Practitioners of England, which is to take the place of the existing Society of Apothecaries.

That a Council should be established to superintend medical registration, and for the general control of medical education and practice. That one of Her Majesty's principal Secretaries of State should be the President; that two-thirds of the Council should be registered Medical Practitioners, and the remaining third should be chosen by Her Majesty, with the consent of the Privy Council. That a register should be made and published by the said Council, of all persons entitled to be registered as Physicians, Surgeons, and General Practitioners respectively; the fee being ten shillings for each person so registered. The registration-fees for future practitioners to be—for Physicians and Surgeons, five pounds; for General Practitioners, two pounds. The registration to be renewed annually, but without fees. Fellows of the Royal College of Surgeons to be entitled to be registered as Surgeons. Members of the Royal College of Surgeons to be entitled, after having been examined and admitted by the Royal College of General Practitioners, to be registered as Surgeons and General Practitioners. Those persons to be entitled to be registered as Physicians who shall have been admitted as Members of the Royal College of Physicians, according to the provisions of a new charter which has been prepared for the College.

The powers of the Council are defined in general terms in reference to by-laws, examinations, education, &c.

It is then proposed, that no one who is not registered should be judged capable of performing any act which is required by law to be done by a medical practitioner; nor should any but a registered person be appointed to any office which is deemed by the Council to be a public medical or surgical office: nor should any but registered General Practitioners be entitled to demand or recover fees for medical or surgical attendance, or for medicines prescribed or administered.

That penalties should be imposed, by summary process, on all unregistered persons practising medicine or surgery; also on all unregistered persons falsely pretending to be registered, or assuming any name or designation to which they are not entitled.

Finally, a suggestion is thrown out for uniting the three kingdoms in the proposed measure, and establishing uniformity of education and qualification in the several branches respectively.

This proposition, although at present in a crude state, will furnish some useful hints to the Medical Registration Committee. It combines the leading features of the Medical Registration Bill, with the plan of preserving unimpaired the existing grades in the profession. The only substantial objection which we have heard

raised against Mr. Wakley's Bill was that it was too democratic—that it merged all classes in one general registration, without regard to the distinctions of rank already established and recognized. However popular this one faculty principle may be among the million, it will not readily be adopted by the medical bodies, who have been accustomed for a long series of years to enjoy a position which has acquired the force of a vested interest. In the time of Henry VIII., prior to the first act for the appointing of Physicians and Surgeons (1511), there was but one class of medical practitioners in this country. The progress of science, and the wants of the public, have led to the establishment of different grades and departments founded on the principle of the division of labour. To merge these distinctions into one faculty would be to restore the original chaos. Before such an experiment is tried, it would be prudent to await the result of a similar movement in the political world on the other side of the channel, where the glorious principle of equality is rampant.

It is of the highest importance that every encouragement should be given to talent and industry, and that every facility should be afforded to individuals for rising to the rank which their own merit would entitle them to enjoy. All barriers to promotion being removed, no one could have any right to complain. Those who object to a place at the bottom of the ladder should walk to the top, instead of requiring an Act of Parliament to lift them up, or rather to lay the ladder flat and thus bring down others to their level. Whatever may be the fate of the proposition of the allied powers, there can be no doubt about the policy of the conference, and we trust that a similar disposition to concede minor points, for the purpose of arriving at a satisfactory conclusion, will prevail in the Parliamentary Committee.

In July, 1845, we suggested a conference of the medical bodies as being the only course likely to lead to this result, and experience having confirmed the opinion we then entertained, we repeat the paragraph.

'The plan of consulting each party separately has failed, and is not at all likely to succeed, because, whatever measure may be approved by the first party, will, of course, be crippled by the second, and the result will be cut to pieces by the third. Each party having taken out a slice, and put in a slice, the compound is a wreck of patchwork alike unpalatable to all.

'We think this inconvenience might be avoided by the appointment of a *small* committee, consisting of the representatives of the several grand divisions of the profession, who might be brought face to face before a Committee of the House of Commons conversant with the subject of Medical Reform, and competent to weigh the respective arguments and prejudices in the balance.

'By the method above described, coupled with a disposition on all sides to discuss the question rationally and dispassionately (an experiment hitherto untried) the disputes among medical men might easily be settled.'—Vol. V, page 7, July, 1845.

There is one omission in the proceedings of the Parliamentary Committee which reminds us of a certain manager, who entertained the public with the play of Hamlet with the part of Hamlet leftout.

The main object of medical legislation is to provide the public with qualified practitioners to alleviate and cure disease. This is effected by means of remedies. In order that the right remedy may be prescribed,the education of the Physician is a subject of grave consideration with the Committee. A good prescription being written, the Committee are satisfied; whether the person who prepares it be educated or not is a matter of no consequence. To use another form of expression—a good cheque being written, the creditor is satisfied; whether the banker be solvent or not, is a matter of no consequence. A man would shudder at the idea of his cheque being dishonoured—a Physician would equally shudder at the idea of his prescription being prepared by an incompetent person; yet the medical profession and medical reformers will not condescend to make one effort to promote the education of the Chemist and Druggist, in whose hands is the reputation of the Physician and the life of the patient.

Sir De Lacy Evans has given notice in the House of Commons, of a motion to this effect:

"That the following words be added to the instructions given to the Select Committee appointed to inquire into the laws and charters of Practitioners in Medicine and Surgery, viz., '*And also to inquire into the defective state of the law respecting Pharmacy, and the Education of Chemists and Druggists, and to report the evidence, with their opinion thereon, to the House.*' "

This motion has been postponed more than once, on account of pressure of other business in the House, and at the time of our going to press, it had not been brought forward. We trust, however, that the efforts of Sir De Lacy Evans will be successful, feeling persuaded that the facts which would be adduced during such an inquiry, would fully bear out the arguments which we have for more than seven years been urging in favour of a Bill to regulate Pharmacy. The proposition of the Honourable Member is no more than an act of justice to the Chemists and Druggists of this country, for the subject of Pharmacy has already been alluded to in the Committee, and cannot easily be excluded from an investigation professedly embracing the whole medical profession. If, therefore, the subject be mentioned at all, it is only fair that the parties most intimately concerned in it, should be heard before the Committee of the House.

THE BENEVOLENT FUND DINNER.

It has been decided that the Dinner for the benefit of the Benevolent Fund of the Pharmaceutical Society is to take place on Tuesday, the 16th of May, after the close of the Annual Meeting. The chief reason for appointing both these meetings on the same day is to afford to Members in the country, who may desire to attend, the opportunity of attaining two objects by one journey. It was also considered that the period of the year is favourable for the purpose. The following is the list of Stewards up to the present time ; but the list is still open, and any Members who may feel disposed to add their names, are particularly requested to communicate with the Editor of this Journal, or the Secretary of the Society. The Committee are desirous of inviting all the friends of the cause who are likely to accept office, and in case any should have been accidentally passed over, we trust this will be received as a general invitation :—

STEWARDS.

Baiss, W. A.....125, Lower Thames Street.
Balmer, John ..... 82, St. John's Street Road.
Barron, Charles ..... 6, Giltspur Street.
Bartlett, W. ..... 1, Brettin Terrace, Chelsea.
Bell, Jacob .....338, Oxford Street.
Blake, C. J. ..... 47, Piccadilly.
Crafton, R. C..... Croydon.
Davy, Charles .....100, Upper Thames Street.
Deane, Henry..... Clapham.
Earland, John .....172, Bond Street.
Evans, John..... 60, Bartholomew Close.
Farmar, R. A..... 40, Westminster Road.
Ferris, Richard ..... Bristol.
Foulger, S. .....133, St. George's Street, East.
Garle, John ..... 12, Kensington Terrace, Gravel Pits.
Giles, R. B..... Clifton.
Hallows, W. A. ..... 2, Clark's Place, Islington.
Herring, Thomas ..... 40, Aldersgate Street.
Herring, William..... Ditto.
Hooper, William ..... 24, Great Russell Street, Covent Garden.
Horner, Edward ..... 20, Bucklersbury.
Hudson, W. B..... 27, Haymarket.
Humpage, B. ..... 51, Judd Street, Brunswick Square.
Ince, William..... 31, Southampton Street, Strand.
Kelland, Richard..... Greenwich.
Lescher, Joseph S..... 60, Bartholomew Close.
Luckombe, Charles C.. 86, Snow Hill.
M'Cullock, William... 95, Bishopsgate Street.
Meggeson, George ... 61, Cannon Street.
Morson, Thomas, N. R. 19, Southampton Row.
Orridge, B. B..... 30, Bucklersbury.
Pedler, George S.....199, Fleet Street.
Phillips, William..... Luton.
Pigeon, Jun., R. H..... 31, Throgmorton Street.

REDWOOD, T..... 19, Montague Street.
SAVORY, JOHN .....143, Bond Street
SIMKIN, EDWARD..... 2, New Cavendish Street.
STAMPER, RALPH .....140, Leadenhall Street.
SQUIRE, PETER.....277, Oxford Street.
WAUGH, GEORGE.....177, Regent Street.
WINSTANLEY, E. H..... 7, Poultry.
WILKINSON, WILLIAM...248, Strand.
YARDE, GILES ..... 28, Lamb's Conduit Street.

IMPORTATION OF CHLOROFORM FROM SCOTLAND OR IRELAND.

HAVING heard a rumour that chloroform had been seized by the officers of Excise in its transit from Scotland to England, we thought it right to make enquiry at the chief office, in order to be enabled to give authentic information on the subject. We understand that the question has been discussed; and instructions have been issued to collectors that no duty be charged on chloroform when removed from Scotland or Ireland to England.

The 6th and 7th William IV., cap. 72, sect. 1, declares, that the difference of duty payable on spirits in the respective parts of the United Kingdom operates unfairly and unjustly in the manufacture of mixtures, compounds, and preparations, into the manufacture of which spirits enter as the basis or principal ingredient or material thereof, and enacts that there shall be levied upon the several mixtures, preparations, &c. mentioned in the schedule on their removal from Ireland to Scotland, and from Ireland or Scotland to England, certain duties which are severally described; and corresponding drawbacks are allowed on their removal from England to Scotland or Ireland. The 5th Victoria, cap. 2, sect. 25, and 6 and 7 Victoria, cap. 49, modify these duties and drawbacks, retaining the principle involved in the Act.

The question was, therefore, raised, whether chloroform, being a product obtained by the distillation of spirits with other ingredients, should, although not mentioned in the Act, be considered as a medicated spirit, and as such liable to the duty. It is stated by a manufacturer that it requires six gallons of plain spirits at 60 per cent. overproof to make one gallon of good chloroform, from which it might be inferred that the duty of 4*s.* 2*d.* which applies to spirit-mixtures would not be nearly sufficient as a countervailing duty between Scotland and England. The difference however is lessened by the fact that the same spirit can be used more than once in the process.

But further investigation of the properties of chloroform shews that it is not a spirit mixture, or a spirit, according to the meaning of the Acts. It may be made from wood naphtha, and when so prepared could not readily be distinguished from chloroform made with spirit, except by a slight difference in the odour.

Chloroform and alcohol are essentially different in their natures; for chloroform is heavier than water, and almost entirely insoluble in

it; while alcohol is lighter than water, and miscible with it in all proportions. Chloroform will not make tinctures and medicated spirits; it cannot be converted into alcohol, nor can it be applied to those purposes for which alcohol is used. It may, however, be employed as a solvent for various substances; but this circumstance does not bring it within the terms of the Act. So far as the Act is concerned, it is rather classed with alcoholic extracts or chemicals, in the preparation of which alcohol is used, and afterwards separated. In calculating the countervailing duty on spirit mixtures it is the custom to compute the quantity of proof spirits represented by, or entering into, the composition of the said mixtures. This cannot apply to chloroform, because it contains no spirit, and as the spirit used in its formation may be employed again, the value in spirit cannot be estimated.

It is not likely that the consumption of chloroform will be sufficient to form an important item in the revenue; but to the English manufacturer this is an instance, in addition to many others, in which the inequality of the duty in the three portions of the United Kingdom operates injuriously: for, although the spirit may be used repeatedly, as is the case in the manufacture of alcoholic extracts and many chemicals, there is in every operation a certain amount of waste; and it may be stated as a general rule that, in every operation in which spirit is used, the English manufacturer is a sufferer.

This hardship is at the maximum in the competition with manufacturers in foreign countries where the duty on spirit is so small as to be merely nominal, while the product is not, on its importation, subjected to a duty.

CANNEL COAL GAS.

The endeavours on the part of a new gas company to obtain a footing in the parishes at the west of the metropolis, have given rise to much controversy and difference of opinion. It had, in fact, in Marylebone become a party question, in which the opponents and the advocates were respectively stigmatised by each other as monopolists and jobbers. The various discussions having been reported in the newspapers, we advert to the subject for the purpose of elucidating one branch of it which has not been properly sifted or considered by the parties concerned in the controversy: we allude to the economical statistics in the manufacture of Cannel Coal Gas.

The leading argument of the Western Gas Company, and that on which they founded their chief claim to the privilege of laying down pipes in the parish, was their undertaking to supply Cannel Coal Gas seventy-four per cent. superior in illuminating power to the gas in common use, and free from impurities, at the same price per thousand cubic feet as that which, at the time of their application, was charged by the existing companies in London. The only evidence adduced in support of this statement was the certificate of three eminent Chemists, who had analyzed certain samples of gas made with especial care in an apparatus temporarily erected for the purpose by the Company, and this certificate stated that the said samples were free from impurities, and superior in illuminating power to ordinary gas by seventy-four per cent. No information however was given as to the cost of producing

this article, and the inquiries made by some members of the committee, respecting the statistics of the process, were met by equivocal or evasive answers. It had been stated by some authorities that Cannel coal gas could not be produced in London at the price quoted. The question was one easily solved by experiment and calculation, which it might have been supposed that any prudent Board of Directors would have undertaken before embarking in a speculation, the success of which must depend entirely on the result of this inquiry. Yet no attempt was made to refute the rumours as to the supposed impracticability of performing what was promised, and the Marylebone Vestry, apparently insensible of the importance of the inquiry, ultimately accepted the bare assertion of the Directors in lieu of evidence, and granted permission to lay down the pipes.

In a pamphlet on Gas Works and Cannel Coal Gas, by Mr. Taylor (Chairman of the Western Gas Company) the question as to the cost of the gas is disposed of in an ingenious manner. After quoting the chemical report above alluded to, Mr. Taylor observes,

"In addition to the proofs adduced by the examination we have made of the processes and by the above report, I may state that the Cannel Coal Gas was for three years in operation at the South Metropolitan Works, and during that time ample proofs were given of its superiority. At the shop of White and Greenwell, Silk-mercers, Blackfriars' Road, one counter was supplied with Metropolitan Cannel Coal Gas at 11*s.* per thousand feet, while an equal number of lights, on the opposite counter, were supplied by the Phœnix at 9*s.*, and at the year's end, in summing up the cost, it was 25 per cent. in favour of the dearer gas.

The facts that the gas from Cannel Coal as used in Edinburgh is infinitely superior in brilliancy to that in London, and that the processes of purification do not diminish, but, on the contrary, increase the illuminating power, are, I consider, fully proved.

"With regard to price, if this gas were sold at 8*s.* per thousand feet, it will be equal in economy to the ordinary gas at 4*s.* 7*d.*

"I have now, I think, gone through the four points I proposed to explain, and trust that I may have convinced my hearers of what I am fully satisfied myself, viz. that the introduction of superior Cannel Coal Gas into London is highly desirable, and can be effected at less price than the present impure gas—that it will be conducive to the health of great numbers in the metropolis, and, therefore, well merits our attention."

Now it is a remarkable circumstance, that during the time that the South Metropolitan Company was supplying Cannel Coal Gas at 11*s.* per 1000 cubic feet, no dividend was received by the shareholders. Yet Mr. Taylor follows up his allusion to that Company, by the hypothesis, "if this gas were sold at 8*s.* per 1000 feet," which hypothesis—a mere conjectural supposition—is the basis of his calculations!

In an article by Mr. Leslie, in the *Builder* of March 18th, a quotation is given from Mr. George Lowe's evidence on the cost of Cannel coal gas, extracted from an official report, which was printed in 1847, by order of the House of Commons. From this report and evidence it appears that the Liverpool Gas Company was, at the time to which it refers, supplying gas at 4*s.* 6*d.* per 1000 feet—that it was made from the best Cannel coal at 15*s.* 6*d.* per ton—that the average produce from a ton of this coal was 9,600 cubic feet of gas and 13 cwt. of coke.

The cost of 1000 cubic feet of gas is calculated as follows:—

		PENCE.
Coal		17.83
Labour		3.85
Lime		0.59
Repairs of works		1.18
Repairs of mains		0 86
Repairs of retorts		2.68
		26.94
Credit—coke, tar, &c.		4.85
		22.09
Add 10 per cent.		2.20
		24.29
Salaries and office charges		4.25
		28.54
Tools	0.67	
Cartage, waste	0.10	
Ropes, blocks, paint, cement, engine caps, and yard charges	0.62	
Rates and taxes	1.10	
Interest and commission	0.60	
Law charges	0 25	
Bad debts	1.43	
		5.45
		33.99
£10 per £100 share dividend		20.15
		54.14

This calculation shows a profit of ten per cent. on the supply of Cannel coal gas at Liverpool at 4*s*. 6*d*. per 1000 cubic feet. But it must be remembered that the calculation is founded on the assumption of 15*s*. 6*d*. a ton as the price of Cannel coal. We believe the price of this commodity in London generally ranges from 30*s*. to 50*s*. A short time ago, we obtained a ton for experiment, and the price then was 55*s*.

With these data, it would not be diffcult to estimate the probable cost of Cannel coal gas in London at any time by a rule of three sum, the market price of Cannel coal being ascertained. We cannot, therefore, account for the unwillingness or inability of the Directors of the Western Gas Company to furnish this information, except on the supposition either that the result would not bear out their statements, or that they are not practically acquainted with the business which they have undertaken.

The importance of the question to the public at large is obvious, since a reduction in the price of gas, and an improvement in its quality would be highly advantageous. We should, therefore, be glad to obtain evidence in favour of the new project, and offer these observations for the purpose of directing attention to the practical view of the subject, which has been hitherto kept too much in the back ground by the advocates of Cannel Coal Gas.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected March.

MEMBERS.

Derby	Bloor, Joseph, 45, Queen Street
Ealing	Harris, George
Guildford	Gardner, John, High Street
London	Huxtable, J. 104, St. John's Street Road
	Huxtable, W. ditto, ditto
	Jackson, Js. B. 89, Bishopsgate Street
Manchester	Haworth, David, 45, Piccadilly
Ruthin	Bancroft, John Jones, Well Street
Stockport	Wild, Thomas, 24, Great Underbank
Sunderland	Walton, John, 300, High Street, Bishop Wearmouth
Tunbridge Wells	*Reeves, Walter W. Old Parade
Wetherby	Ridsdale, James, Market Place
Weymouth	*Cole, Walter Thomas, 18, St. Mary St.
Wigan	Mort, Alfred M. Market Place
Winchester	Andrews, Henry A. Great Minster Str.

MAJOR EXAMINATIONS.

Banks, Alfred J. H.	Birmingham
Swann, William Henry	Farnsfield

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Beach, James	Barnicott and Beach	Bridport
Crisford, Charles	Mr. Plomley	Rye
Coles, Ferdinand	Mr. Burcham	London
Davis, William G.	Mr. Cross	Shrewsbury
Dickson, William	Mr. Elliott	Berwick
Fairbarn, George	Mr. Stevenson	Derby
Foulsham, Thomas R. H.	Mr. Cooke	Norwich
Luff, Henry Thomas	Mr. Dakin	Poplar
Smith, Arthur	Mr. Keeling	Epsom

PHARMACEUTICAL MEETING,

WEDNESDAY, MARCH 8th, 1848,

MR. JACOB BELL IN THE CHAIR.

The following communications were made :—

ON THE ACTION OF HYPOCHLORITE OF LIME ON ORGANIC COMPOUNDS.

BY MR. WILLIAM BASTICK.

Chlorinated lime, or bleaching powder, is now satisfactorily ascertained to consist of two definite compounds existing in relative proportions, viz., hypochlorite of lime and chloride of calcium. It also contains caustic lime in a greater or lesser quantity, and a small portion of free chlorine.

The following formulæ will explain the changes that take place when caustic lime is thoroughly impregnated with chlorine under favourable conditions :—

$$Cl_2 + (Ca\ O)_2 \text{ form } (Cl\ O + Ca\ O) \text{ and } (Cl\ Ca).$$

It is to the powerful re-actions produced by the hypochlorite of lime, thus formed, on other bodies that the bleaching powder is indebted for its remarkable properties. It is this salt, in conjunction with caustic lime, which causes the extraordinary metamorphosis of the alcohol in the formation of chloroform.

The above circumstance induced me to examine its behaviour with other organic bodies.

When one part of bleaching powder is mixed with three parts of water, a highly concentrated solution of hypochlorite of lime is formed, containing a large quantity of chloride of calcium in solution and caustic lime in suspension. Upon the addition to this mixture of a strong solution of sugar a violent re-action is brought about, attended by a great increase of temperature.

This operation was conducted in a retort for the purpose of ascertaining whether any volatile product was formed, but no heat was applied until the commotion in the retort had subsided.

As a caution to others of the dangerous violence of this re-action, it may be mentioned, that having been led to suspect that a small quantity of some organic compounds had come over into the receiver with the water, I was induced to operate on a larger scale by mixing four pounds of chlorinated lime with the same quantity of water in a large glass vessel capable of holding more than two gallons, which was connected with a receiver by a long glass tube. Having added the solution of sugar, and adjusted the apparatus, the whole in a few moments was dashed

to atoms, as well as everything in its neighbourhood, by the vehemence of the re-action which ensued.

The results of this decomposition, when carefully conducted, remain entirely in the retort, as nothing but aqueous vapour with a little free chlorine came over into the receiver, even upon the application of heat. On examining the contents of the retort, the sugar, when not used in excess, was found to have been completely decomposed, as well as the hypochlorite of lime. The results of the decomposition were found to be formate of lime, chloride of calcium, caustic lime, and water.

The elementary changes which had taken place the annexed formulæ will explain.

1 equivalent of sugar	C_{12}	H_9	O_9		
6 equivalents of hypochlorite of lime			O_{12}	Cl_6	Ca_6
6 equivalents of caustic lime			O_6		Ca_6
	C_{12}	H_9	O_{27}	Cl_6	Ca_{12}.

which transform themselves into

6 equivalents of formate of lime	C_{12}	H_6	O_{24}		Ca_6
3 equivalents of water		H_3	O_3		
6 equivalents of chloride of calcium				Cl_6	Ca_6
	C_{12}	H_9	O_{27}	Cl_6	Ca_{12}.

These formulæ show the active agency of the caustic lime on the mixture in combining with the formic acid, and will also probably assist in explaining why it is necessary to have an excess of caustic lime in preparing chloroform, although theoretically, according to Liebig (*Handbuch der Chemie*), it would appear that the caustic lime plays no part in the process.

When sugar is treated with hypochlorite of lime, from which the excess of lime has been removed, the results of the decomposition are carbonic acid, water, and chloride of calcium. Chlorine will also be present with the carbonic acid in the receiver; but it arises from the chlorinated lime always containing a small quantity uncombined. The nature of the above re-action will be rendered clear by the subjoined formulæ:—

1 equivalent of sugar	C_{12}	H_9	O_9		
12 equivalents of hypochlorite of lime			O_{24}	Cl_{12}	Ca_{12}.
	C_{12}	H_9	O_{33}	Cl_{12}	Ca_{12}.

are converted into

9 equivalents of water		H_9	O_9		
12 equivalents of carbonic acid	C_{12}		O_{24}		
12 equivalents of chloride of calcium				Cl_{12}	Ca_{12}
	C_{12}	H_9	O_{33}	Cl_{12}	Ca_{12}.

Hypochlorite of lime acts on starch, cotton, linen, and all the varieties of vegetable fibre, in the same manner as on sugar,

although with a greatly diminished force, arising, doubtless, from their physical aggregation.

In fact, all oxyhydrocarbons, whose oxygen and hydrogen are in the proportion to form water, suffer precisely the same change as sugar, when treated with hypochlorite of lime with or without excess of lime.

It exercises no notable effect on those organic compounds which are rich in carbon and hydrogen, such as camphor, the essential oils, &c. It decomposes creosote much in the same manner as chlorine is described to act, that is, by converting it into a resin-like body.

Those organic compounds of animal origin, such as gelatin, wool, silk, &c. which contain nitrogen as one of their elements, when exposed to the action of hypochlorite of lime with excess of lime, undergo an analogous decomposition with the addition of the formation of ammonia. But under some conditions, which are not clearly defined, the nitrogen combines with the carbon of the organic body, and forms a cyanogen compound.

Gelatin may be taken as an illustration of the nature of the change to which this class of organic bodies are subject, because its elementary composition has been ascertained with more accuracy than the other similar compounds. When gelatin, in a state of solution, is submitted to the action of this salt, its decomposition is more slowly effected than is the case with the saccharine solution. The ammonia that is formed passes over free into the receiver, and the retort contains, as in the other examples, formate of lime, chloride of calcium, and uncombined lime.

The following formulæ will be an expression of the re-action which gelatin undergoes when treated as above described :—

2 equivalents of gelatin	C_{26}	H_{10}	N_4	O_{10}			(Mulder).
15 equivalents of water		H_{15}		O_{15}			
7 equivalents of hypochlorite of lime ...				O_{14}	Cl_7	Ca_7	
13 equivalents of caustic lime				O_{13}		Ca_{13}	
	C_{26}	H_{25}	N_4	O_{52}	Cl_7	Ca_{20}.	

which produce

13 equivalents of formate of lime.....	C_{26}	H_{13}	O_{52}			Ca_{13}
4 equivalents of ammonia		H_{12}		N_4		
7 equivalents of chloride of calcium					Cl_7	Ca_7
	C_{26}	H_{25}	O_{52}	N_4	Cl_7	Ca_{20}.

The chloride of calcium contained in the original solution of the bleaching powder, seems to have no active agency in producing the elementary changes of the organic bodies submitted to the action of the chlorinated lime. It has been generally considered by some of the best authorities, that chlorinated lime

acts as a bleaching agent through the great affinity of the chlorine for the hydrogen of the organic substance exposed to its action. These facts will prove the erroneousness of this theory, and will show that it possesses a highly oxidizing property, and that organic bodies are decomposed in virtue of this property, and that as a general result chlorine does not combine with any of the elements of the organic body. Even the formation of chloroform from alcohol is not altogether an exception to these rules, because three parts of the alcohol are oxidized, and only one part chlorinized.

As it is somewhat difficult, in the ordinary way, to detect the presence of formic acid when contained in solution with other organic matter, the method pursued in these investigations will be here described.

It may be as well to state previously, that it is almost impossible to avoid having a portion of any organic body in excess when being treated with hypochlorite of lime, if it be wished to preserve the formic acid produced, because excess of hypochlorite of lime decomposes formic acid, and converts it into carbonic acid and water. For the purpose of detecting the formic acid, the fluid in the retort was filtered from the insoluble caustic lime. It was then supersaturated with diluted sulphuric acid, which threw down nearly the whole of the lime as a sulphate, setting free the formic and hydrochloric acids. The undissolved sulphate of lime was separated by filtration from this solution. The filtered liquid was then distilled, the formic and hydrochloric acids passing over into the receiver, by which means they were separated from the non-volatile organic matter. The contents of the receiver were neutralized with ammonia, carefully avoiding an excess of the volatile alkali. Nitrate of silver was then added in excess, consequently precipitating the whole of the hydrochloric acid, and forming formate of silver. By a gentle heat, the formate of silver was decomposed, and metallic silver precipitated as the result, which is a characteristic test of formic acid. The chloride of silver may be separated from the matter precipitated by caustic ammonia. From the weight of the metallic silver, the quantity of formic acid may be estimated by calculation.

NOTICES OF SEVERAL PHARMACEUTICAL SUBSTANCES,

Recently received from St. Petersburgh.

BY JONATHAN PEREIRA, M.D., F.R.S.

THE following notices refer to several curious and interesting articles which I have recently received from Professor Ludewig, of St. Petersburgh :—

1. SWIMMING BLADDERS OF SEVERAL SPECIES OF ACIPENSER FROM THE WOLGA.

Professor Ludewig has kindly sent me the dried air or swimming bladders of three species of *Acipenser*, namely, the *A. Huso*, *A. Güldenstadtii*, and *A. stellatus*. These are placed on the table for the examination of the Members of the Pharmaceutical Society.

I had been for some time anxious to possess specimens of these swimming bladders, in order that I might further satisfy myself of the real nature and position of the isinglass membrane.

In the second edition of my *Elements of Materia Medica*, pp. 1859 and 1861, I have stated that the innermost layer of the swimming bladder is insoluble in boiling water, and is not the gelatigenous or isinglass membrane. I came to this conclusion from a careful examination of the sound of the cod-fish, and of the unopened pipe and purse isinglasses of commerce, all of which I found to be lined with an insoluble epithelium. In the leaf isinglass imported from Russia this membrane has been removed, probably by rubbing with a cloth; and as in some species of *Acipenser* this layer is exceedingly fine its presence is apt to be overlooked. But in the swimming bladders of some other fishes it is much thicker, and its non-removal in them considerably deteriorates the commercial value of the isinglass which they yield. The insolubility of the inner lining of the Hudson Bay purse isinglass is well known to the dealers.

Dr. Edward Martiny, the learned author of the *Naturgeschichte der für die Heilkunde wichtigen Thiere*, published at Darmstadt last year, has, however, denied the accuracy of my account of the gelatigenous or isinglass membrane. He describes these bladders as consisting of two membranes (*Hauten*) an *outer*, strong, shining and fibrous membrane, and an *inner* soft mucous coat. The outer membrane is covered by a peritoneal coat. "The inner membrane, namely the mucous membrane, is the so-called isinglass." To this sentence he has appended a foot-note, of which the following is a translation:

"Pereira (*Elements of Materia Med.*, vol. ii., 2d. edit. p. 1861) erroneously regards the middle coat as yielding gelatine."

This statement, emanating from so high an authority as Dr. Martiny, induced me to re-examine the subject, and the result is the confirmation of the accuracy of my former statement. I have now examined the swimming-bladders of four species of sturgeon, and in all find their inner coat, or lining, to consist of an epithelium insoluble in water. In some, however, it is so exceedingly delicate as to require very careful microscopic examination to detect it.

In the spring of the present year I obtained the swimming bladder of the common sturgeon (*Acipenser Sturio*) caught in the Thames, and found its lining membrane to be a very delicate, but insoluble, epithelium. I gave a portion of it to my friend Mr. John Quekett, of the Royal College of Surgeons, and requested him to examine it, and the following is the reply which he sent me :—

"I have carefully examined the sections of air-bladder, and I find that commencing with the inner coat you have—

"1st.—An epithelial layer, then,

"2dly.—The membrane to which the epithelium is attached (basement membrane), then,

"3dly.—Some flaky spindle-shaped bodies, which give the silvery appearance, then,

"4thly.—Some fibrous tissue, arranged principally in two directions, probably the muscular or elastic coat; then,

"5thly.—Some areolar tissue, and,

"6thly.—Lastly of all the serous coat.

"I have not tried the solubility of these layers in boiling water, but should think it must be the middle or thick substance which is the gelatinous coat."

On the receipt of the air bladders of the three species of *Acipenser*, sent me by Professor Ludewig, I resolved to submit them to a careful microscopic examination in order to ascertain in them, the existence or absence of an inner epithelial or insoluble layer. I have detected it in all of them. I subjoin figures representing the microscopic characters of the epithelial and gelatigenous coats in one species.

a. Acipenser Huso.—This fish, called by the Russians the *Bieluga*, yields the isinglass known by the name of the *Bieluga leaf*. The dried air bladder, laid on the table of the Society, is a pyriform bag about the size of a small pig's bladder. Its length is about eleven inches, its greatest diameter about five inches. The opening of the ductus pneumaticus is near the larger extremity.

A piece of this bag was digested in distilled water, and then carefully examined by the microscope.

Fig. 1.

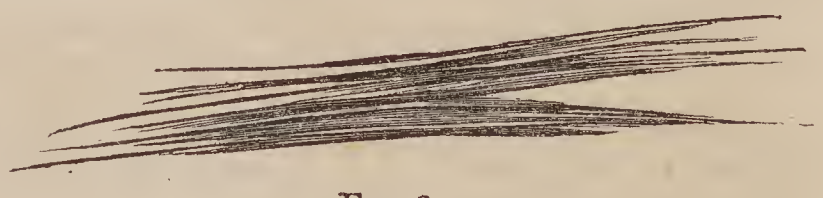


Fig. 2.

Fig. 1 represents the appearance of the inner epithelial, or insoluble membrane, when highly magnified. Fig. 2 shows the appearance of the gelatigenous or true isinglass membrane. The fibres constitute "the spindle-shaped bodies" mentioned by Mr. Quekett as occurring in the air bladder of the *Acipenser Sturio*.

b. Acipenser Güldenstadtii.—From this fish is obtained both *staple* and *leaf* isinglass. The dried pyriform swimming bladder, now laid before the Society, is of the kind called in commerce the pipe. Its length is about ten inches, and its greatest diameter about three inches. The opening of the ductus pneumaticus is at the larger extremity.

c. Acipenser stellatus. — This yields *leaf* isinglass. The pyriform swimming bladder of this fish, which I have received from Professor Ludewig, is also of the pipe kind. Its length is eight inches, and its greatest diameter two and-a-half inches.

2. BRICK OR TILE TEA.

Under the name of *Ziegelthee*, or *Tile-Tea*, I have received a rectangular or prismatic block or cake of compressed leaves and leaf stalks weighing two pounds and thirteen ounces avoirdupois. It is thirteen inches long, six and a half inches wide, and about an inch thick. It is the *Table-Tea* (*Tafelthee*, or *Thea tabulata*) of the Mongols. In Germany it is sometimes called *Backsteinthee*, or *Brick-Tea*, on account of the shape of blocks.

The cake is of an olive greenish colour, and has a faint odour, somewhat resembling that of common tea. The leaves and stalks are so firmly cemented, or pressed together, that the cake possesses considerable hardness or firmness, and is with difficulty cut with a knife.

Accompanying the block of brick-tea, I received a paper, coloured red on one side and impressed with Chinese characters, which has been kindly translated for me by John Reeves, Esq., F.R.S., of Clapham. The following is the translation :—

"OBSERVE. CHANG TAC YING.

"Our shop is at Tsung Ngan, in the Min district. We have a choice collection of *Keun Me* (royal eye brow), *Ke Tseang* (banner and lance), and *Yu Tsein Ya* (sprouting before the rains) teas. The teas are genuine, and the prices equitable. We do not take advantage of young or old, and our character is well established throughout the whole country. There are some dealers so eager after profit that they most nefariously mix up inferior leaves with their teas, injuring the quality of the latter, and shamefully cheating their customers—but our seal is a guarantee against fraud.

"Merchants and customers need be under no anxiety in dealing with us—for whether they purchase a whole chest, or smaller quantity, we guarantee alike the whole. Thus the world may judge of our honesty.

"Those noble customers who honour us with their patronage are requested to take particular notice of the seal of our firm."

To this translation Mr. Reeves has added the following note:—

"I almost doubt whether this bill belonged to the *brick* tea, as brick tea is not usually sold at Tsung Ngan.

"The brick or tile tree is very extensively used in Tibet and Tartary, where it is sent by *caravan loads*. See Ball's *Account of Tea; Moorcroft's Travels; Timkowski;* and *Pallas*.

"The tiles vary in size—

I have 14-inches by $7\frac{1}{2}$ } 1_1 inch thick.
others $8\frac{1}{2}$ " by $4\frac{3}{4}$ }

"I have also tea made up in balls varying in circumference, 21, 17, 12, 9, and 8 inches respectively."

In 1836, Dr. F. Rehmann communicated to a German medical periodical an extract from the writings of the late Dr. Jos. Rehmann, physician to the Emperor of Russia, giving an interesting account of this tea. This notice also appeared in the 19th vol. of the *Annalen der Pharmacie*, as well as in the 36th vol. of the *Berlinisches Jahrbuch für die Pharmacie*. But the most recent and full account of brick-tea is contained in Erman's *Travels in Siberia*, of which an English translation, by Mr. W. D. Cooley, has just been published by Messrs. Longman & Co. From this work I extract the following account of it:

"From M. Basin, in Kiakhta, I learned that, instead of current coin, brick-tea alone is used here for money. This article, to which I have frequently had occasion to allude, is a mixture of the spoiled leaves and stalks of the tea plant, with the leaves of some wild plants and bullock's blood dried in the oven. In Irkutsk, where an imitation of it has been attempted, elm leaves, sloe leaves, and some others, have been substituted with tolerable success for those of the wild plants of China. In the southern provinces of China there are a number of manufactories in which this article is prepared. It is divided into pieces weighing from three to three and a half pounds each, and having always the same prismatical form, exactly like that of our bricks (in Russian, *kirpich*). Hence, they may be called in Germany brick-tea, with more propriety than tile-tea, as they are usually styled. The Manchoos themselves never make use of this production, but to the Mongolian nomades in China, to the Buraets and Kalmuks collectively, to the Russian peasants south of the Baikal, and to most of the Siberian Tartars, it is become as indispensable as bread in Europe. About 300,000 pounds—that is, 4000 bales, or half horse loads (in Russia, *miésta*)—of it are brought annually to Kiakhta. This is sufficient for the supply of 10,000 people, if it be assumed that they drink brick-tea twice a day the whole year round, as they do now during the winter. Every brick or kirpich contains sixty or seventy portions, because the infusion made with it is mixed also with rye-meal, mutton fat, and with *kujir* or búsun, that is, salt from the lakes in the Steppes. The rich people among the Russian Buraets and the Kalkhas Mongols lay by stores of this article, which serve them for money, although the weighed silver bars which are used in China reach the bazaar in Urga also, in the course of trade. In dry situations the brick-tea will remain a long time undeteriorated; and, consequently, an accumulation of it in the Steppes is often thought a better and safer treasure than great herds and flocks. In Maimachen and

Kiakhta it is an article of no less importance. The Russians purchase an immense quantity of it from the Chinese; but besides the kirpich or brick of tea is the money unit and standard of value, in which the price of every other kind of exchangeable property is expressed.

"The merchants of Kiakhta commence their dealings, therefore, by asking those of Maimachen how many bricks the commodities which they wish to purchase are valued at; or, in other words, at what price they are set down for the year. They then put upon the squirrel skins, which they bring to market in great quantities, a fixed price in tea-bricks and their fractions; and their further traffic is carried on by written bills, always expressed in the same vegetable money. Russian officers, when they wish to make small purchases in the shops of the Chinese, buy of their fellow-countrymen in Kiakhta, for Russian money, the requisite capital in bricks. In this transaction, the exchange of the rooble into the tea-brick is managed by taking the value of each as compared with the squirrel's skin, the rooble being changed according to the market price of the skin in Irkutsk, the tea-brick according to that in Maimachen.

"The tea-brick, at this time, was worth about two roobles. It is often necessary to pay fractional parts of this unit, which the Russians and Buraets cut off, measuring by the eye, and the Chinese make no difficulty about taking in payment the pieces cut in this way. To meet my expenses, I preferred depositing 100 roobles with M. Basin in Kiakhta. One of his clerks, who accompanied me as guide and interpreter, told the Chinese merchants that I possessed bricks then, and subscribed the accounts, which they drew up in Chinese characters, and kept to be presented when the time of settlement came."—Vol. II. p. 236—238.

"In the shops in Tobolsk we saw the brick-tea as it is called (*Kirpichui Chai*), eagerly called for by the Tartars. These brick-shaped masses of leaves of various kinds, pressed and cemented, or, as it were, felted together, also come from China, and they probably constitute one of the most important articles of the trade of Tobolsk, as the Turcoman tribes inhabiting the country far prefer the drink prepared from it to the tea properly so called."—Vol. I., p. 347.

3. SUMBUL ROOT.

This root, sometimes called, on account of its musky odour, *musk-root*, comes from Bucharia. It is supposed to be the root of an umbelliferous plant. It contains a volatile oil and two balsamic substances. Two acids, one called *sumbulol acid*, and the other termed *sumbulom acid*, has been obtained from it. I am informed by Dr. Martiny, of Darmstadt, that it is now much used in Germany in dropsies, &c.

SPONTANEOUS FORMATION OF PRUSSIAN BLUE ON A GRAVEL WALK.

Mr. Redwood described a case which had recently come under his notice, in which the surface of flint stones, forming part of a gravel-walk, had become coated with a film of Prussian blue, under very curious and interesting circumstances.

A gentleman in the neighbourhood of Ipswich, Mr. Thomas Fox, of Rushmere, in making a walk in his garden, had put a layer of the refuse lime, which had been used for purifying coal-gas at the gas works, immediately under the material of which the surface of the walk was composed, with the view of preventing weeds from growing there. When the walk was first made, the refuse lime was covered with sand obtained from a neighbouring common, but this was found not to form a good and firm walk; nevertheless, it was allowed to remain there for a year or more. At the expiration of this time the sand was removed, care being taken to avoid, as much as possible, disturbing the stratum of lime underneath, and gravel, obtained from the same common that the sand had previously been brought from, was laid down to the thickness of a few inches. In three or four weeks after the substitution of the gravel for the sand, it was observed that some of the largest of the gravel stones began to assume a blue colour on those parts of them which were exposed to the air and light. This effect continued to increase until the colour became of a bright and deep blue, but it was confined to the largest of the gravel stones, the finer gravel remaining unaltered, and those parts of the coloured stones not immediately exposed to the light and air retained their original appearance. No change of a similar description had taken place in the sand during the period that it occupied the place of the gravel, although it was, apparently, exposed to the same conditions as those under which the colouration of the gravel had occurred.

Several of the coloured stones which were taken off the walk, after having remained there for about a year, were laid before the meeting. They were common flint stones, presenting, on those parts of their surface which had not become blue, the white opaque appearance which flints frequently acquire.

Mr. Redwood stated, that when his attention was first directed to this case, he thought it probable that the blue colour was due to the formation of *ultramarine* by the action of sulphuret of calcium, contained in the refuse lime, on the silica of the flints. A slight examination of the colouring matter, however, soon made it evident that it was not ultramarine, but *Prussian blue.* It had been long known that cyanogen compounds existed in the refuse lime of gas works, and there could be no doubt that the colouration of the stones was due to some decomposition of these compounds in contact with the flints and under the influ-

ence of light and air ; but with regard to the exact nature of this action he was not prepared to offer an opinion. He had only received the particulars of the case a few days previously, and had not yet made any investigation with a view to its explanation, beyond determining the nature of the colouring matter. His principal object in bringing the subject at that time before the meeting, was to ascertain whether similar effects had been observed elsewhere. He recollected having seen a gravel walk in front of a house in the vicinity of London, a few years ago, which presented the same appearance as the gravel under notice, but he had at that time concluded that something had been poured over the walk which had occasioned the blue colour. He was now disposed to think it had been a similar case to the present; but he could not recollect the exact spot where he had seen this so as to make inquiries respecting it. The subject was one of considerable interest, and he hoped, on a future occasion, to be able to give some rational explanation of it.

NOTE BY MR. REDWOOD.

Since the foregoing communication was made at the Pharmaceutical Meeting, I have ascertained from Mr. Warington that a similar case was described at a meeting of the Chemical Society, in May, 1842, by Mr. Porrett, and the following account of it published in the "Proceedings" of that Society :—

ON A CURIOUS FORMATION OF PRUSSIAN BLUE.

BY ROBERT PORRETT, ESQ.

Mr. Porrett was led to attend to this subject by an observation accidentally made while walking in the garden of a friend. He found that a great number of the pebbles in the gravel walk were tinged of a fine bright blue colour ; and on remarking the appearance to the owner, and inquiring as to the cause, though it had never before attracted notice, he ascertained that before the fresh gravel had been laid down, the walks had been strewed with some refuse lime from the gas works, for the purpose of destroying the worms, and over which the red gravel of the neighbourhood of London had been placed only a few weeks before the appearances described were observed.

The blue colour was entirely confined to the upper surface of the pebbles which was exposed to the atmospheric air, and was found to be Prussian blue. The pebbles affected were siliceous, having a white exterior coating. Mr. Porrett considers this production of Prussian blue to have arisen from some of the gas-lime having been dropped accidentally on the surface of the new gravel, and that the peroxide of iron there found had been deoxidized by some of the sulphur compounds contained in the gas-lime, giving rise to the formation of a combination of iron with cyanogen, also present in the lime, and calcium, and that this compound had been decomposed by the action of the carbonic acid of the atmosphere, or by the siliceous matter of the stone, and thus causing the formation of the Prussian blue.

The subject was further investigated by Mr. Warington, who communicated the following results of his experiments to a meeting of the Chemical Society, on February 7th, 1843 :—

EXPERIMENTAL OBSERVATIONS ON THE FORMATION OF PRUSSIAN BLUE UPON THE SURFACE OF GRAVEL,

THROUGH THE MEDIUM OF FERROCYANIDE OF CALCIUM.

BY ROBERT WARINGTON, ESQ.

In a communication formerly made to the Society by Mr. Porrett on the above subject, that gentleman considered the production of Prussian blue to have arisen from some of the gas lime employed to destroy the worms &c., and placed under the fresh gravel, having been accidentally dropped on the surface, and that the peroxide of iron contained in the gravel had been deoxidized by some of the sulphur compounds of the gas-lime, giving rise to the formation of a combination of iron with cyanogen and calcium, and that this compound had been decomposed by the action of the carbonic acid of the atmosphere, or by the siliceous matter of the stone, thus causing the formation of Prussian blue. An artificial ferrocyanide of calcium was formed by mixing hydrate of lime and Prussian blue to the consistence of a cream ; and this was placed in an open part of a garden, and numerous white-coated siliceous pebbles, selected from the red gravel of the neighbourhood of London, then partly immersed in the mixture, so that the upper surfaces might be exposed to the action of the atmosphere and moisture ; in a few days the sides of the pebbles assumed the blue colour, which gradually spread itself to the summits, having the same bright tint as the pebbles presented to the Society by Mr. Porrett, proving therefore, that the ferrocyanide had been drawn to the surface, either by that curious species of crystalline growth, if the expression may be allowed, which is exhibited by so many saline combinations during their crystallization, or by capillary attraction united with evaporation from the exposed parts of the pebbles, thus rendering it evident that the ferrocyanide might reach the summit of the gravel from below.

Other substances were then submitted to the same action, to decide the question as to the siliceous matter of the stones being in any way instrumental in the production of colour. White limestone pebbles, from the south coast of Devon, and baked pipe-clay, underwent the same changes, with the exception that the blue tint was not so bright and clear as was the case on the siliceous surface ; but this is considered attributable more to the perfect whiteness of the siliceous coating, and the decidedly superficial film of Prussian blue which was produced on it. Independent of this, the effect can only be attributable to the action of the carbonic acid gas present in the atmosphere slowly decomposing the ferrocyanide of calcium, and generating the blue stain.

I did not, at first, see how the facts as stated in reference to the case I have described, that the sand and the small gravel-stones underwent no change of colour, could be explained in accordance with Mr. Warington's results, but having mentioned this difficulty to him, I received the following note on the subject :—

Apothecaries' Hall, March 22d, 1848.

Dear Sir,—The points you mentioned to me I think may be explained by the fact, that it appears necessary for the ferrocyanide of calcium to be drawn so high above the surface of the ground or imbedding material as to become dry, and thus exposed to the action of the air and sun, so as to undergo decomposition.

I also observed, in my experiments on this subject, that a porous, rough-

ened, or abraded surface was best fitted for the production of the effect, by which the solution could be drawn up, or the capillary crystalline growth assisted. The white superficial coating of the flint appears admirably adapted for this purpose.

This production of Prussian blue may be seen beautifully developed in the flint walks in the neighbourhood of the gas-works at Ramsgate, the refuse gas-lime from the purifiers having apparently been employed as an ingredient in the cementing material. They are, in many places, of a splendid blue colour for several yards in extent.

I remain yours, very truly,

T. Redwood, Esq. Robert Warington.

THE ANEROID BAROMETER.

Mr. Redwood drew the attention of the meeting to a new description of barometer, called the *Aneroid barometer*, the construction of which he explained. This instrument, which has recently excited a good deal of interest among scientific men, is the invention of a Frenchman, M. Vidie. It is constructed on a principle wholly different from that of the common mercurial barometer, inasmuch as it contains neither mercury nor any other liquid. Its action depends on the effect produced by the pressure of the atmosphere on a circular metallic box or case, exhausted of air and hermetically sealed.

The plate (fig. 1) represents the external appearance of the instrument. It is four inches and three quarters in diameter across the face, and one inch and three quarters in thickness. The pressure of the atmosphere is indicated by a hand pointing to a scale, which is graduated to correspond with the common barometer. There are also two small thermometers fixed on the face, as shown in the drawing, but these are not essential.

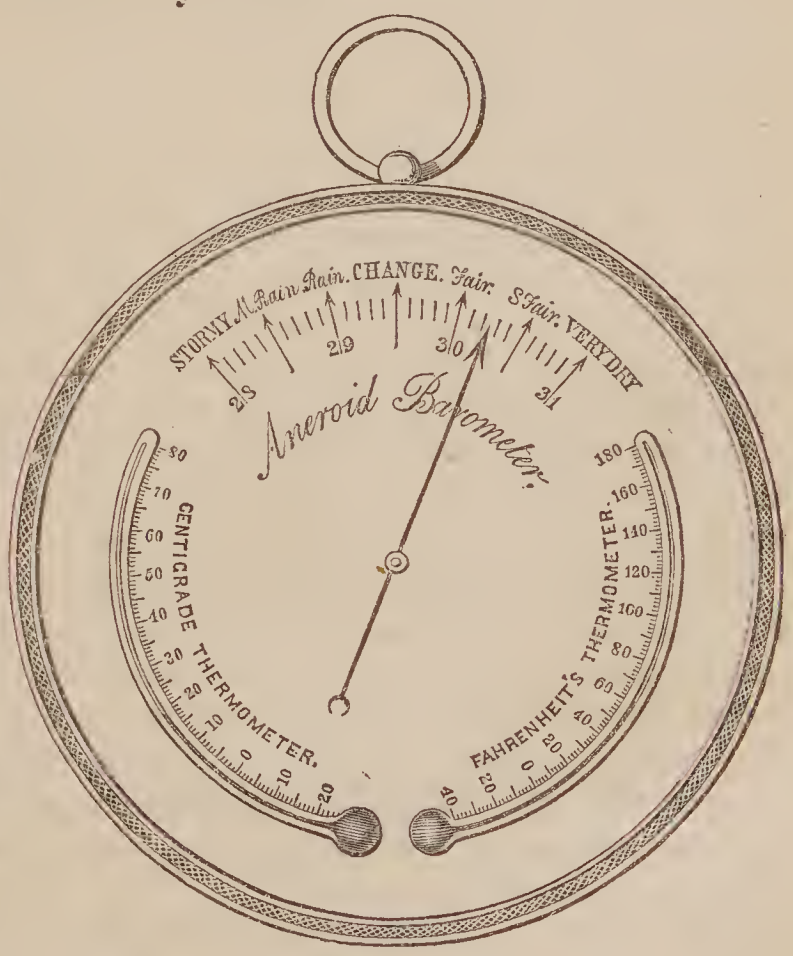


Fig. 1.

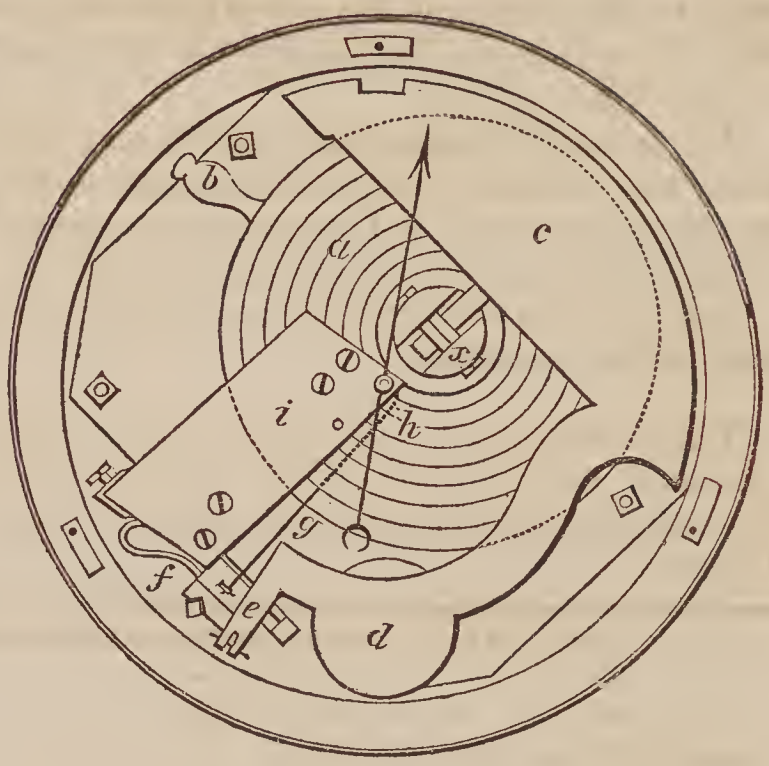


FIG. 2.

Fig. 2 represents the internal construction, as seen when the face is removed, but with the hand still attached. *a* is a flat circular box, about a quarter of an inch in depth, which is made of some white metal. It looks something like a shallow shaving-soap box, having the upper and under surfaces corrugated in concentric circles. This box being exhausted of air, through the short tube *b*, which is subsequently made air-tight by soldering, constitutes a spring, which is affected by every variation of pressure in the external atmosphere, the corrugations on its surface giving it greater elasticity. It is fixed at the bottom of a metallic case, which encloses the whole of the mechanism of the instrument. At the centre of the upper surface of the elastic box there is a solid cylindrical projection, *x*, about half an inch high, to the top of which the principal lever, *c*, *d*, *e*, is attached, as shown in the drawing. This lever rests partly on a spiral spring at *d*; it is also supported by two vertical pins, with perfect freedom of motion. The end, *e*, of the large or principal lever is attached to a second or small lever, *f*, from which a chain, *g*, extends to *h*, where it works on a drum attached to the arbour of the hand. There is also a hair-spring at *h*, to regulate the motion of the hand, the attachments of which are made to the metallic plate *i*.

The motion originates in the corrugated elastic box *a*, the surface of which is depressed or elevated as the weight of the atmosphere is increased or diminished, and this motion is communicated through the levers to the arbour of the hand at *h*. The spiral spring on which the lever rests at *d*, is intended to compensate for the effects of alterations of temperature on the minute portion of air which the box, being exhausted by a pump, necessarily contains.

The actual movement at the centre of the elastic box, from whence the indications emanate, is very slight, but this is increased 657 times at the point of the hand; so that a move-

ment to the extent of the twenty-second part of the tenth of an inch in the box, carries the point of the hand through three inches on the dial.

As far as this instrument has hitherto been tried, its indications have been found closely to assimilate to those of the mercurial barometer, over which it possesses advantages in point of size, and in the facility with which it may be used for measuring altitudes.

One of these instruments was laid on the table for the inspection of the members.

There were also on the table a great number of valuable specimens of some rare articles of Materia Medica, which had been presented to the Society, for their Museum, by Mr. Batka, of Prague.

ORIGINAL AND EXTRACTED ARTICLES.

OZONE AS A PROBABLE CAUSE OF DISEASE.

As every fact that contributes to a more exact knowledge of those agents which exercise the greatest influence in different conditions of the atmosphere must be welcome to the scientific public, the following notice of ozone, considered as a probable cause of disease, for which we are indebted to Professor Schönbein, will assuredly be deemed worthy of attention. As is well known, Schönbein attempted many years ago to show that when currents of ordinary electricity issue from points into the atmosphere, a substance is produced similar to that which is manifested, together with oxygen, on the positive electrode by the decomposition of water in a voltaic pile, and by the action of phosphorus on moist air. To this substance the term *ozone* has been applied as expressive of its strong ŏdour. His experiments have further shown, that this remarkable substance is not only so eminently oxidizing, as, for instance, rapidly to oxidize silver at an ordinary temperature, but also, that when inhaled, even if mixed with large quantities of air, it produces effects similar to those occasioned by chlorine and bromine. Ozone irritates the mucous membrane of the respiratory organs in the same manner, and even induces intense catarrhal affections. As electrical discharges incessantly occur in the atmospheric air, ozone must also be continually produced in quantities which are probably proportionate to the intensity of these charges. Ozone must therefore, in the course of time, accumulate in the air, if it be not removed by the mass of organic substances covering the earth's surface, and which it would appear, from Schönbein's experiments, all destroy ozone. This substance decomposes iodide of potassium at an ordinary temperature, by separating the iodine—a separation that is not effected either by ordinary oxygen, nitrogen, or a mixture of atmospheric air and carbonic acid ; and provided the iodide of potassium is free from iodate of potash, it may, when added to a solution of starch, serve to indicate the minutest quantity of ozone in any amount of air, and consequently in the atmosphere ; and it will be evident that this iodide paste will be coloured blue with an intensity proportionate to the quantity of ozone present in the atmosphere. If at any time a bottle be filled with fresh atmospheric air, and a strip of paper rubbed over with the iodide paste put into it, the paper will remain uncoloured, however long it may be retained within the bottle, and however large a quantity of carbonic acid is mixed with the air. But when the iodide paste is exposed to the free action

of the air, it will experience a more or less rapid change of colour in accordance with the attendant circumstances ; thus, for instance, it will gradually assume a blackish-blue colour if kept in a moist state, this colour again changing to a brownish tinge when it is dried. When kept in a room, from which the air is excluded as much as possible, the paste changes very slowly to a bluish or brownish colour, whilst near cesspools, even where there are only traces of sulphuretted hydrogen, and in all places where sulphurous acid is liberated, it does not alter its colour. It is easy to explain the cause of the iodide paste not turning blue in inclosed air, and being altered only when exposed to free atmospheric influences. Even if the air inclosed in the bottle, or in a larger space, should contain ozone, the quantity is too small to separate sufficient iodine from the iodide of potassium to impart any perceptible colour to the paste. In a free atmosphere, containing ozone, the iodide paste is every moment brought in contact with fresh strata of air, each one of which yields ozone to the paste, and separate the iodine, and, consequently, so much iodide of starch will be formed as to manifest its presence by its well known colouration.

Sulphuretted hydrogen or sulphurous acid instantaneously destroys the ozone, and this fact explains the reason of the paste not being coloured blue in the neighbourhood of cesspools, &c. According to Schönbein's numerous and long-continued experiments, the paste of the iodide of potassium varies at different times in the rapidity with which it turns blue in the open air ; for instance, it often becomes bluer in the course of a few hours than at another time during as many days. Taken on an average, the blue coloration is more rapid during the colder seasons of the year ; and Schönbein finds, from frequent observations, that the paste turns blue with extreme intensity and rapidity during a fall of snow. There are, however, often, many days in the middle of summer, in which the paste is very rapidly coloured blue, this being especially the case in thunder-storms. The fall of snow is connected with very marked electrical excitement of the atmosphere, a phenomenon that may probably be mainly owing to the breaking up of the snow flakes, for it is well known that the disintegration of solid bodies gives rise to electricity. Experience has further shown, that the formation of ozone, occasioned either by ordinary or voltaic electricity, is great in proportion to the low degree of the temperature. These circumstances, therefore, explain the reason why the paste of the iodide of potassium is so rapidly and strongly coloured blue during a violent snow storm, and why ozone is so copiously produced ; and the cause of the free atmospheric air being on an average more richly charged with ozone in the winter than in the warmer parts of the year, may likewise be explained by the fact, that a smaller quantity of ozone must be absorbed by the surface of the earth in winter than in summer, since, at the former season, fewer organic substances—that is to say, fewer oxidizable matters—are in contact with the air (principally owing to the snow which covers the earth) than during the periods of active vegetation.

It is an established fact, that in winter catarrhal affections of the mucous membrane of the respiratory organs often occur suddenly, and prevail so generally, as to admit of their being regarded as epidemic. No one can doubt that these phenomena are owing to a definite condition of the atmosphere, but, at the same time, no one has as yet explained the nature of this condition. If it were shown that, at certain periods, perceptible quantities of chlorine or bromine were manifested in the atmospheric air, and if further, their occurrence were found to be connected with the general prevalence of catarrhal disease, no one would hesitate in ascribing these affections to the presence of the chlorine or bromine. Now, it is a fact, that by the inhalation of proportionally small quantities of ozone, effects

are produced similar to those which are occasioned by the inhalation of air containing chlorine or bromine.

Ozone, like chlorine, irritates the respiratory mucous membrane, and gives rise to intense catarrhal affections. This led Schönbein, many years ago, to conjecture that various catarrhal diseases may be owing to the quantity of ozone contained in the atmosphere. In the course of the last winter, catarrhal affections were frequently so prevalent in Bâsle, that scarcely any one escaped. In order, therefore, to see how far the intensity and rapidity of the blue coloration of the paste of the iodide of potassium in the open air was connected with the prevalence and intensity of the catarrhal affections, Schönbein instituted a series of experiments with respect to the first point, and several of the physicians of that place at the same time made daily observations on the last-named subject, the comparison of which respective series of inquiries showed that at every period, when the blue colorization had been manifested with the greatest intensity, catarrhal affections had likewise been most general and violent. This striking coincidence appears certainly to favour the view, that the amount of ozone in the air is not an unimportant cause in inducing catarrh. In order, however, to arrive at perfect certainty with regard to this subject, further observations are essentially necessary. As these may easily be carried on (it being only requisite to rub a piece of paper with a mixture composed of pulverised iodide of potassium mixed in a solution of starch, and exposed to the free air), it is to be hoped that such experiments may be very generally pursued, conjointly with thermometrical and barometrical observations. Ozone, as has already been observed, is instantaneously decomposed by sulphuretted hydrogen and sulphurous acid: it would, therefore, be interesting to determine whether persons living in the neighbourhood of sulphur-springs, or workmen engaged in metallurgic operations in which sulphurous acid is liberated, are not less subject to catarrhal affections than those who live in a pure atmosphere.

In conclusion we may remark, that two hypotheses have been advanced in explanation of the nature of ozone. According to Delarive and Berzelius, ozone is an allatropic modification of oxygen, occasioned either by electricity or by the catalytic action of certain substances (as, for instance phosphorus). Schönbein considers ozone as a higher stage of the oxidation of hydrogen, a compound which is produced either under electric or catalytic influences. Berzelius regards atmospheric ozone as an allatropic modification of the oxygen in the atmosphere produced under electrical influences. Schönbein, on the other hand, conjectures that it is formed in the establishment of electrical equilibrium in the atmosphere, when a portion of the atmospheric oxygen combines with aqueous vapour. The subject under consideration is not, however, affected in any way by the greater correctness of one or the other of these views.

CONDITION OF THE EARTH AND ATMOSPHERE,
DURING THE YEARS 1845, 1846, AND 1847.

Sir,

THERE being no subject that at present engages the consideration of scientific men more than the cause of the late epidemic, and the scourge with which we are threatened, I am induced to transmit to you, for insertion in your widely-circulated Journal, the accompanying statement, which shews the change that has taken place in the electrical condition of the air, from October 1845, to the end of 1847.

I have the honour to be, Sir,

Westminster Road,
March 17, 1848.

Your obedient Servant,
FRANKLIN COXWORTHY.

STATEMENT.

Statement, showing the relative electrical condition of the Earth and the Atmosphere during the years 1845, 1846, and 1847, as indicated by the evaporation of water from two copper vessels or scales, one insulated and the other not. The vessels are seven and a half inches diameter, containing each about thirty-two ounces of water, and suspended under a lean-to roof on the north side of a wall, where they are protected from the influence of wind, sun, and rain. They are fourteen feet from the ground, with which one is electrically connected by a stout copper wire.

DATE.	1845.		1846.		1847.		REMARKS.
	Insulated.	Non Insulated.	Insulated.	Non Insulated.	Insulated.	Non Insulated.	
January....	The vessels, or scales, were first filled on the 10th October, 1845.	—	—	270	115	140	*See* the Tables of Mortality afforded by the Registrar General.
February...		—	—	70	280	105	
March		—	365	33	370	130	
April.....		—	215	75	195	195	
May.....		—	310	345	225	185	
June.....		—	445	460	200	175	
July.....		—	900	100	215	225	
August		—	245	35	355	65	
September.		—	225	120	345	65	
October.....	960		280	145	150	275	
November..		—	130	195	90	290	
December..			245	135	80	320	
Grains.....	960	—	3,360	1,983	2,620	2,170	

	Insulated.		Non-Insulated.
A comparison of the last quarters will give for 1845 ...	960	to	Nil.
1846 ...	645	"	475
1847 ...	320	"	885
			320
Excess of evaporation from non-insulated vessel, in quarter of 1847			565
Add excess of evaporation from insulated vessel, in quarter of 1845			960
Total difference in electrical condition in 1845 and 1847 ...			1,525

N.B.—In 1845, when the earth was negative, or there was an excess of evaporation from the insulated vessel, the potato disease prevailed; in 1847, with a reverse condition, we had an abundant harvest, and diseases of the animal kingdom to an unusual extent.

PETROLEUM IN DERBYSHIRE.

(*Note from* Andrew Ure, M.D., F.R.S.)

There has lately been discovered in a deep coal mine in Derbyshire, a great deposit of semi-fluid petroleum, which is now being brought up by the water-pumps, in the quantity of about 100 gallons daily. Some of it was sent to me for examination. I find its specific gravity to be 0.900. It affords, by distillation, upwards of half its volume of a fine light naphtha, like that of amianth in Italy, which forms an excellent solvent for caoutchouc. The pitch that remains in the still, when properly boiled, will serve for ship-building and caulking purposes, much better than that made from Stockholm tar, as it is less liable to be decomposed by the joint action of air and water.

Bloomsbury Square, 21st March, 1848.

THE UPAS TREE.

(*From Capt. Belcher's Narrative of a Voyage to the Eastern Islands.*)

Among the curiosities noticed on this excursion, may be mentioned an isolated Upas tree (*Antiaris toxicaria.*) It is situated at the bend of the river, near the watering-place, and stands nearly forty feet high; its trunk is almost straight, and covered with a somewhat smooth bark, of a reddish-tan colour, and its head consists of a dense mass of dark green, glossy foliage. There are numerous incisions around the base of the stem, made by the natives for the purpose of procuring the poisonous juice for tipping the arrows of their sumpitans.

Although, ominously, the Burmese have selected the supposed deadly shade of the poison-tree as a place of interment, and the ground beneath is crowded with tombs, yet vegetation flourishes luxuriantly around its roots, and clings to its base to such a degree, that I experienced some little difficulty in approaching the stem for the purpose of tapping it for a portion of sap. On approaching the tree, I experienced no ill effects from the effluvium which it is asserted by Leschenault de la Tour and others, is frequently sufficient to produce nausea, vertigo, and vomiting The Malays, however, that accompanied us, viewed the tree with evident suspicion. In order to prove by experiment, the effect of the Upas poisoned sumpit or arrow, it was tried on a troublesome cat near our house, but it had not the rapid effect we were led to imagine. A little while after the receipt of the wound, there was foaming at the mouth, followed by spasmodic contractions of the limbs, ending in exhaustion and frequent convulsions, which caused the animal to tumble into the river, and thus terminated the life of the unfortunate feline victim of experimental science. The Upas does not then, after all, appear to be nearly so poisonous in its properties as the Manchineal (*Hippomane mancinella*) of the West Indies, the dew that falls from the leaves of which blisters the skin, and many people are reported to have died by simply sleeping under its branches. In Java, there is a plant called Tjettek, or Upas Rajah, from the roots of which, one of the most dangerous of known vegetable poisons is prepared, acting like nux vomica.

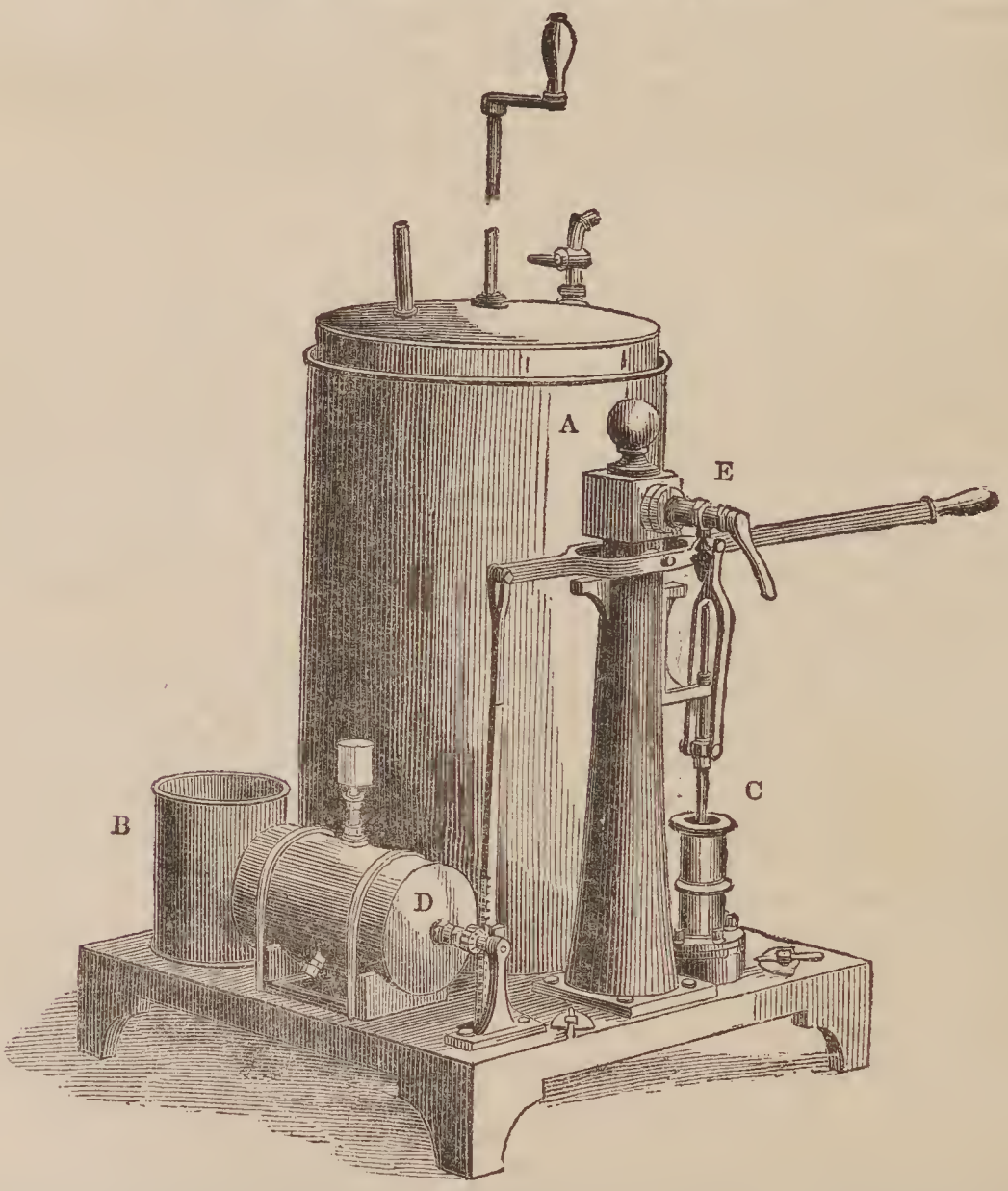
This must not be confounded with the real Upas or Antiaris, as it is a true Strychnos (the *S. tieute)* and belongs to the same genus as the St. Ignatius' beans of the Phillippines (*S. ignatia*) and the plant (*S. toxifera*)

which furnishes the basis of the Wourate poison, which the intrepid and enthusiastic Mr. Waterton brought from Guayana. The Upas, Hippo, Antojar, or Upo, is found in Java, Bali, and Celebes, as well as in Borneo, and it is a curious fact, that the wholesome and useful bread-fruit tree, the delicious mulberry, nay, even the famous cow-tree of South America which supplies the Indians with milk, and the common fig, should, with their luxuriant properties, belong to the same natural order of plants which includes the deadly Upas.

SODA WATER MACHINE.

REGISTERED BY MESSRS. J. TYLOR AND SON.

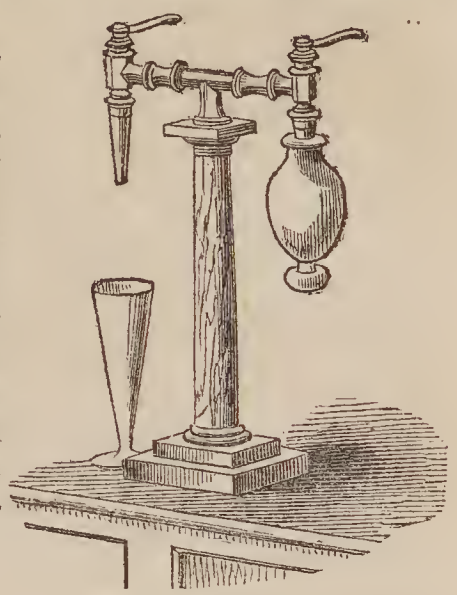
Warwick Lane, Newgate Street, London.



This machine consists of a copper gas generator, *A*; solution pan, *B*; pump, *C*; condenser, *D*, with safety valve; bottling cock, *E*; and a separate attachment from the condenser to supply a fountain on the counter, if required. It is complete without a lead generator, but if that is preferred it can be added with its gasometer in the place of the copper gas generator. One man working at this apparatus can, without assistance, manufacture and bottle twenty-four dozen of soda water or lemonade in the day.

The whole machine (gas work included) is compressed into a square of two feet six inches, and everything is fixed firmly upon the iron frame which forms the foundation.

It is well known, that if a fountain is supplied with soda water from a reservoir, that after a few glasses have been drawn, the aërated liquids become comparatively insipid; but when the soda water is drawn directly from the machine, as it is in this arrangement, it may be obtained in the highest perfection from the fountain at the counter. No one machine has been hitherto introduced which could feed a fountain, and also be bottled from in the usual manner, and which would manufacture soda water and lemonade, in small quantities, at nearly as low a cost per gross as a large machine.



Bottling Apparatus as adapted to a counter.

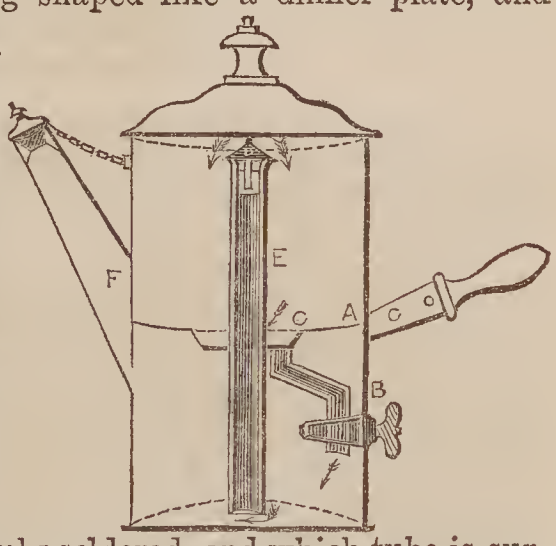
A full description of the method of using the machine, is given in vol. v., p. 364 of this Journal, where a larger apparatus, on the same principle as the above, is described.

As some practice is required to bottle soda water by hand, a machine which will enable any inexperienced person to bottle aerated fluids, can be supplied with the machine.

WALLER'S PATENT COFFEE-POT,

BY SHOOLBRED, LOVERIDGE AND SHOOLBRED, WOLVERHAMPTON.

This invention consists of a vessel divided into two equal parts by a solid partition, A; this partition being shaped like a dinner plate, and having the central deepest portion pierced by a hole, around the edge of which is attached a bent tube connected with a tap, B; so that by this arrangement, a passage or way may be opened or shut off at pleasure from the upper to the lower half of the vessel, through the strainer C, which consists simply of a piece of very finely perforated metal, soldered around the dished part of the partition. Ascending from within a short space of the bottom of the lower chamber to within nearly the top of the upper one, is a tube, E, passing through the partition and perforated plate, to both of which it is firmly soldered, and which tube is surmounted by a valve, D. F is an ordinary spout, having a ground stopper or plug, fitting air-tight.



Directions for Use.—The stopper being removed from the spout, pour the requisite quantity of water into the upper half of the vessel, turn the tap downwards, so as to allow the water to run into the lower half; when it has done so, put in the ground coffee, taking care that none of it lodges on the valve, then turn the tap again horizontally, replace the stopper, close the lid, and stand the vessel quite upright on the fire; when the valve is

heard rattling rapidly and distinctly, and steam escapes freely from under the lid, take the coffee-pot quite away from the fire, allow it to stand about *two or three minutes—not more*, then turn the tap downwards, and the infusion will rapidly filter into the lower division, and be at once ready for use in a beautifully bright and boiling condition. The water *may* be used hot or cold; if hot water be employed, the whole process of making a gallon of coffee need not occupy more than three or four minutes. Always boil the milk and rinse out the pot before using it.

The *principle* of this apparatus will be readily perceived. When it is placed on the fire, the water in the lower division is forced, by the pressure of steam and air, up the central tube, lifting the valve, and made to fall in a uniform stream, *at a gradually increasing temperature upon* the coffee; as soon as all the water above the inferior orifice of the central tube has been forced up, then only steam arises; when the vessel is removed from the fire, the valve falls and prevents the re-entrance of air into the lower chamber, after its total expulsion thence by the steam; during the period of infusion, the steam in the lower chamber is allowed to condense, and thus a partial vacuum is produced and preserved for any period, and rendered available for effecting rapid filtration whenever desired, by the employment of the tap.

[Although this vessel is intended merely as a coffee-pot, it is equally applicable to some pharmaceutical purposes. For ordinary infusions it might be used with convenience, extracting in a short time the soluble matter contained in the ingredients and acting as a filter at the same time. When lengthened maceration is desirable, this may be regulated by retaining the infusion in the upper part of the vessel, and turning the tap B at the proper time, when the clear infusion will percolate through the ingredients in a few seconds.—Ed.]

ON THE PREPARATION OF ABSOLUTE ALCOHOL, AND THE COMPOSITION OF "PROOF SPIRIT."

BY MR. JOSEPH DRINKWATER

(Communicated by Professor Graham.)*

The following experiments were undertaken, principally with a view to determine the relative proportions of anhydrous alcohol and water in revenue proof-spirit, for which purpose it was necessary to procure alcohol in its absolute or pure state.

The processes employed were as follows:—

Carbonate of potash was exposed to a red heat to deprive it of water, and when sufficiently cool was pulverized, and added to ordinary alcohol of specific gravity .850 at 60° F. till it ceased to dissolve any more; the whole was then allowed to digest twenty-four hours, being frequently agitated, when the alcohol was carefully poured off.

As much fresh-burnt quick lime as was considered sufficient when powdered to absorb the whole of the alcohol, was introduced into a retort, and the alcohol added to it; after digesting forty-eight hours, it was slowly distilled in a water-bath at a temperature of about 180° F.

The alcohol thus obtained was carefully redistilled, and its specific gravity at 60° F. was found in two experiments to be .7946 and .7947; agreeing very nearly with the determination of Rudberg, which has been adopted by Gay-Lussac and others, viz. .7947 at 59° F.

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* Communicated by the Chemical Society, having been read June 21, 1847.

It may be proper to state, that the specific gravity was taken with a stoppered bottle, which was always counterpoised by another empty bottle of the same glass and form, placed in the opposite pan of the balance ; the capacity of the weighing bottle at 60° F. was exactly 1000.01 grains of distilled water ; and it was found on trial that this bottle could be repeatedly filled with the same liquid with no greater variation than one or two hundredths of a grain.

The temperature of the room in which these experiments were made was always brought to 60° F. ; and the thermometer used was a standard instrument by Newman, and extremely sensitive (being graduated to one-tenth of a degree) ; on being plunged into the weighing bottle filled with alcohol it displaced about 4½ grains of that fluid ; this portion was replaced from the stock quantity (brought at the time to the proper temperature) by means of a pipette.

With a view, however, to discover whether it were possible by means of lime to abstract any more water from the alcohol, the retort was again filled with fresh-burned and pulverized quicklime and the same alcohol mixed with it ; the mixture was then allowed to digest a whole week at the ordinary temperature of the laboratory, about 60° F. After this time the alcohol was distilled off as before, but was redistilled very slowly, at first at the rate of about one drop in ten seconds (heat of water-bath 165° F.) ; this was continued until about one-twentieth of the whole had distilled over, the object being to allow any minute quantity of water which the alcohol might still retain to evaporate or diffuse itself into the atmosphere of absolute alcohol above it ; the redistillation was then continued rapidly, the heat of the bath being increased to 180° F. till about one-twentieth more had passed over ; the receiver was then changed and the remaining part slowly distilled off.

The specific gravity of this alcohol taken twice was .7944 at 60° F. As a further test of its purity it was divided into two equal parts ; one part was again digested on quicklime, and the other on sulphate of copper deprived of water by heat, the method of operation being as follows :—

1st. Some lumps of fresh-burnt quicklime were heated to a red heat, and in that state quickly pulverized and introduced into the tin boiler of a small still, which was partly immersed in water to prevent the melting of the solder.

This vessel was completely filled with quicklime, and was kept corked till sufficiently cool, when the alcohol was added, but it being comparatively small in quantity the lime appeared perfectly dry : the vessel was then securely corked.

2d. A quantity of sulphate of copper was exposed to a red heat till completely deprived of water ; it was then quickly pulverized and introduced into a small tin-boiler, and when cold the alcohol (which was insufficient to cover it) was added, and the vessel closely corked.

These vessels with their contents were kept at the ordinary temperature of the laboratory (about 60° F.) for four days ; they were then partly immersed in a water-bath, and kept at a temperature of about 150° F. for forty-eight hours, after which the alcohol was distilled and re-distilled with all the precautions before-mentioned ; the temperature of the water-bath on the redistillation never exceeded 172° F., and the first tenth part was put aside in each case as possibly impure.

The specific gravities of the alcohol thus obtained were as under :—

	Alcohol distilled from desiccated Sulphate of Copper.	Alcohol distilled from Quick Lime.
I.	.79470	.79409
II.	.79472	.79412

From these experiments it would appear that sulphate of copper, when

deprived of water, is not so effective as quick lime in removing the last traces of water from alcohol.

It was observed, however, that in general the specific gravity of the alcohol gradually increased, probably from its hygrometric property, by which it absorbed a minute quantity of moisture from the air on being transferred from one bottle to another ; and thinking consequently that a small quantity of moisture might have been abstracted from the atmosphere during the distillation (which was conducted in the usual way), and the specific gravity thus slightly increased, I considered it desirable to make another experiment, in which this source of error should be guarded against, by conducting the distillation as much as possible out of contact with the external air, and proceeded as follows :

The different portions of alcohol before obtained were mixed together, when the specific gravity was found to be .7947 ; this alcohol was again digested at a temperature of about 150° F. for fourteen days with quick lime, previously heated to redness, as in the former experiment; it was then slowly distilled out of contact with the external atmosphere by means of a tube which passed from the condenser through a cork into the bottle in which it was to remain (the temperature of the water-bath was 175° F.), and the first tenth part was put aside as possibly containing a minute quantity of water; the remainder was then distilled off at 178° to 180° F.

This alcohol was quickly transferred to a dry retort and re-distilled in a similar way (heat of water-bath 172° F.) ; the first tenth part was put aside, and the remainder kept as being pure anhydrous alcohol, or as free from water as it is possible to obtain it by this process. The specific gravity was taken the next day with all the precautions before-mentioned, the alcohol being also kept, during the time of transference, as much as possible out of contact with humid air, when the results of four trials were as follows :—

Temperature of room 60° F. Barometer 29·810.

I.	.793836
II.	.793806
III.	.793798
IV.	.793804
Mean	.793811

A portion of this alcohol was subsequently digested with quicklime for three months ; it was then distilled, and its specific gravity was found to be exactly the same as before.

We may therefore conclude, with considerable certainty, that the number .79381 expresses the specific gravity of absolute alcohol at 60° F., within a very close degree of approximation.

My attention was next directed to the best method of determining the relative proportions of absolute alcohol and water which exist in legal or revenue proof-spirit.

There is some ambiguity in the wording of the act of parliament 58 Geo. III., c. 28, which defines proof-spirit to be "such as shall at the temperature of fifty-one degrees by Fahrenheit's thermometer weigh exactly twelve-thirteenths parts of an equal measure of distilled water," but the temperature of the water is not stated : there is no doubt, however, that the temperature of 51° F. was intended to apply to the water as well as to the spirit ; therefore, taking water at 51° F. as unity, the specific gravity of proof-spirit at that temperature will be .92308 ; or raising the temperature of both to 60° F., the specific gravity will be .91984—the expansions being calculated from Gilpin's Tables.†

† *Philosophical Transactions* for 1794.

It was found by a few preliminary experiments that the specific gravity .91984 would lie between a mixture of 49 absolute alcohol+51 water, and a mixture of 49½ absolute alcohol+50½ water, all by weight. Mixtures were therefore made in these proportions in an apparatus procured for the purpose, consisting of two light flasks, each capable of containing about 2200 grains of water. The alcohol and water were weighed separately in these flasks with the greatest care; after which the flasks were joined without mixing the liquids, the neck of one being ground into the neck of the other for that purpose; the liquids were then thoroughly mixed by transferring them alternately from one flask to the other. The flasks were disconnected when the mixed contents became cool, which were then transferred to a clean and dry well-stoppered bottle, and further secured by tying a piece of caouchouc over the stopper.

It may also be proper to mention, that when placed in the balance, these flasks were always counterpoised by other empty flasks of the same material, and of very nearly equal size and shape; and to prevent loss from evaporation, a ground glass cap was placed over the mouth of each flask as soon as the exact weight was obtained. The errors of observation could not, I believe, in any case exceed one-hundredth of a grain, as the balance used in these experiments was one of Robinson's best instruments, which was previously adjusted by Newman expressly for the purpose; it was turned with its greatest load by less than one-hundredth of a grain.

The proportions of absolute alcohol and water mixed were as under, all by weight. Temperature of room 60° F. Barometer 29.832.

First mixture.—588 grs. alcohol + 612 grs. water, being in the proportion of 49 grs. alcohol+51 grs. water.

Second mixture.—594 grs. alcohol + 606 grs. water, being in the proportion of 49½ grs alcohol + 50½ grs. water.

After twenty-four hours, the bottles having been frequently shaken, the specific gravities of both mixtures were taken, with all the precautions detailed in the experiments on absolute alcohol: and in order to observe if the full condensation was gradual and required time for its completion, the mixtures were allowed to stand, with occasional agitation, for a further period of twenty-four hours, when the liquids were again weighed. The results were as follows:—

At 24 hours, temperature of room 60° F., barometer 29.630
At 48 hours, temperature of room 60° F., barometer 29.550.

First Mixture.		*Second Mixture.*	
I. .920361	after standing 24 hours.	I. .919297	after standing 24 hours.
II. .920358		II. .919297	
III. .920361	after standing 48 hours.	III. .919307	after standing 48 hours.
Mean .920360		Mean .919300	

It thus appears that both liquids attained a fixed specific gravity within the first twenty-four hours.

If we now express the preceding results by measure, and make the proportion of alcohol a constant quantity in the two mixtures, we have—

Alcohol and water by weight. Alcohol.		Water.		Alcohol and water by measure. Alcohol.		Water.		Specific gravity of the mixtures.
49	+	51	in the proportion of	100	+	82.62105	...	.92036
49½	+	50½		100	+	80.98470	...	.91930
			Difference.....			1.63635		106

Dividing the difference of the quantities of water by the difference of

specific gravity, we get .015437, the mean quantity of water corresponding to each unit of difference in the specific gravities. But the difference between the specific gravity of proof-spirit and .91930, one of the observed specific gravities, is 54 ; therefore we have $54 \times .015437 = .8336$, the quantity of water to be added to the spirit of that specific gravity to form proof-spirit, as follows :—

	Alcohol.		Water.		Specific gravity.
	100	+	80.9847	.....	.91930
Add water.....	100		.8336	.....	54
Proof-spirit =	100	+	81.8183	.....	.91984

From the foregoing data the following results have been calculated :—

COMPOSITION OF PROOF-SPIRIT.

Alcohol and Water.		Specific gravity at 60° Fahr.	Bulk of mixture of 100 measures of alcohol + 81.82 water.	Strength per cent. above proof of absolute alcohol.
By weight.	By measure.			
Alcohol. Water.	Alcohol. Water.			
100 + 103.09	100 + 81.82	.91984	175.25	75.25
or in 100				
49.24 + 50.76				

It is remarkable that Dr. A. Steel* arrived at almost the same composition for proof-spirit, namely, 49.2 and 50.8, partly by experiment and partly by calculation.—*London, Edinburgh, and Dublin Philosophical Magazine, February* 1848.

ON NUT OIL.

BY A. OSTERMEIER AND DR. BUCHNER.

Ostermeier states, that a considerable quantity of the earth nut (*Arachis*) having been imported into Bremen, without finding a market, the importers expressed the oil which is sold under the name of *earth-nut oil.* This oil is almost colourless, without smell, and less viscid than olive oil ; its taste is like that of oil of almonds. It is sold at 30 florins per 100 pounds—a price lower than that of common olive oil. The nuts yield fifty per cent. of oil.

Dr. Buchner has accompanied this communication with some observations. After describing the botanical characters of the *Arachis hypogæa, Linn.*, or *earth-nut* plant, which is one of the leguminosæ, he proceeds to say that the fruit is a netted yellowish, gray pod, of from one to three inches long and four to nine lines thick, in which are contained two or three brownish-red ovate seeds, of the size of a small hazel-nut. Their parenchyma is white, very nutritious, and oily, on which account the *Arachis*, which is indigenous in the tropical parts of America, has been transplanted to Asia and Africa, and even to the south of Europe, and is in that climate frequently cultivated and employed for the manufacture of oil. The oily seeds possess a sweet taste, somewhat like that of haricot beans, and are used in tropical countries, partly raw, partly prepared, into

* Dr. Steel's papers, which contain much valuable information on the specific gravity of spirits, are contained in the *Records of General Science* vol. i., pp. 222—255.

a sort of chocolate, which, however, is not so agreeable either in taste or smell as that prepared from cocoa. The oil obtained from the arachis seeds is employed, like the olive oil, for domestic purposes, perfumes, and medicines.

In the year 1825, the seeds of arachis and the oil obtained from them were chemically examined by Payen and Henry, and the results published in the *Journal de Chemie Med. et de Pharmacie*, t. i., p. 431—439.

They obtained the fruits from a gentleman in the south of France, who had made an agricultural experiment with the *Arachis hypogæa*, and reaped about 700 fruits from one plant. In the year 1810, Brioli, Professor of botany at Novaro, wrote a treatise on the arachis, and showed that this plant thrives well in Italy, and that the seeds yield fifty per cent. of their weight of a mild fat oil, which differs but little from fine olive oil, and that after pressing out the oil, a white cake remains behind, which contains starch, and can be used for chocolate. Payen and Henry made the following experiments :—

1950 grammes of fruit yielded 1495 grammes of seeds and 455 of husks. The seeds have a brown thin cuticle, and a white parenchyma, a sweet taste somewhat like that of beans. Pressed in a cold state, they yielded a pale, somewhat greenish clouded oil, but which passed perfectly clear through the filter, and had a fresh almond odour.

The oil-cake heated by steam, and again pressed, yielded a yellowish oil, which also became clear by filtration, but had a disagreeable smell. From the thus twice-pressed oil-cake, ether extracted another quantity of oil, which was, however, more viscid than the expressed oil.

The 1495 grammes of arachis seeds, yielded—

Oil by cold pressure	229	grammes.
Oil by hot pressure	301	"
Oil by ether	33.1	"
Loss	139.9	"
Cake freed of all the oil	792	"
	1495	grammes.

From this a maximum of forty-seven per cent. of oil is calculated.

These seeds contain also a great quantity of nutritious vegetable caseine containing sulphur, which can be extracted by cold water, and precipitated from the solution by acetic acid. The presence of crystallizable sugar, starch, phosphate of lime, malate of lime, chloride of potassium, vegetable fibre and water, was also proved. The same substances, except starch, were also found in sweet almonds, and as the starch was found in the arachis seeds only in a very small proportion, it may be supposed that what Brioli considered as such, was for the greatest part vegetable caseine.

As regards the peculiar properties of arachis oil, Payen and Henry state the following :—

The arachis oil is of a somewhat greenish colour, and has a specific weight of 916.3 at 86° Fahr. It is insoluble in alcohol, but after having shaken the oil with alcohol, the latter becomes somewhat clouded by water. By ether it is perfectly dissolved. At 37° Fahr., a rather large quantity of stearin (?) separates, and at a temperature of 25° or 27° Fahr., the oil solidifies and forms a soft mass, without further increasing in consistency. The hot-pressed oil and that extracted by ether, contain a large quantity of stearin.

From olive oil it is easily distinguished by Poutet's method, for on rubbing it with nitrate of mercury, the arachis oil does not become solid like olive oil, but after a few days a white granular soft substance separates from it.

The cold-pressed arachis oil, on being treated with caustic soda ley in

the cold, saponifies much slower than the hot pressed arachis oil and the oil of almonds ; the arachis soap is whiter, and without any foreign smell. The soap prepared from hot pressed arachis oil, smells, however, disagreeably, and is more coloured than the almond soap.

The coldpressed arachis oil exposed under some circumstances to oxygen, does not become so soon rancid as the oil of almonds. In order to be scented, it requires much less volatile oil, and assumes a more agreeable smell than oil of almonds.

The statements made by Professor Brioli, are consequently in so far to be corrected, that the arachis oil assumes, on being heated, a disagreeable taste, that it does not so easily solidify in a cold temperature as the olive oil, but becomes sooner rancid, and that if mixed with acid nitrate of mercury, it does not coagulate into a stiff jelly like the latter, and bears consequently more resemblance to oil of almonds than to olive oil. So far Payen and Henry.

Dr. Buchner, in examining the oil he had received from Bremen, and which appears to have been hotpressed, made the following observations :

It has a yellow colour like Provence oil, with a slight cast of green, particularly if looked at from above in an oblique direction towards the ground. It is more mobile than olive oil, and thinner than the latter. Its smell at ordinary temperatures, 59° to 68° Fahr., is imperceptible, but if heated to 122° or 167° Fahr., it acquires a smell like sweet oil, but which is not disagreeable. Its taste is less sweet and agreeable than that of oil of almonds and of pure olive oil, which is perhaps the consequence of the arachis seeds from which it was expressed, having already been several years old. Arachis oil belongs, like olive oil, to those oils which are not viscid, and are not drying ; a portion of it in a flat porcelain saucer had been exposed on a heated stove to a temperature varying from 68° to 146° Fahr., and it remained unaltered, without smell, neutral, and of an oily fluidity.

At a temperature of from 34° to 38°, the arachis oil (from Bremen) congeals into a viscid mass like a liniment, without depositing granular margarine, by which it is easily distinguished, both from olive oil and oil of almonds ; that it contains stearine is not likely, and perhaps only supposed to be by hypothesis. It is not quite correct to say, as Payen and Henry have done, that it is not soluble in alcohol, but it certainly is dissolved but with difficulty by it, for spirit of wine of ninety per cent. was heated to 122° Fahr., and shaken with arachis oil, which was added by drops ; the first drops were easily and perfectly dissolved, afterwards, when nothing more appeared to be dissolved, the spirit of wine which had been perfectly clear at 122° Fahr., was removed and left for several hours in a well-corked bottle, in the usual temperature of the room of 59° to 68° Fahr, At this lower temperature the alcohol became turbid, and at the bottom of the bottle a few drops of oil collected. The spirit of wine, which was then removed at the temperature of 68° Fahr., was allowed to evaporate in a porcelain cup, at a moderate temperature, when the oil that had been dissolved remained behind.

One ounce of alcohol of 90 per cent. had contained, at a temperature of 122° Fahr., nine grains, and in that of 68° Fahr., five grains of arachis oil perfectly dissolved ; the result of this experiment is, that one part of arachis oil is soluble in 96 to 100 parts of highly rectified spirit of wine of ninety per cent., at common temperature, and that at a temperature of 122° Fahr., only fifty-three to fifty-four parts of the same alcohol are required to dissolve one part of arachis oil.—*Buchner's Repertorium*, Bd. xlviii., Heft. 2.

ON THE METHODS EMPLOYED FOR DISGORGING LEECHES TO RENDER THEM FIT FOR USE AFTER PREVIOUS APPLICATION.

BY MM. SOUBEIRAN AND BOUCHARDAT.

It is well known that, in a great many localities, leeches are rendered fit for use after previous application, by submitting them to prolonged abstinence, by causing them to disgorge the blood by means of ashes, and keeping them in fresh water frequently renewed. This practice requires certain precautions, which render it difficult of application when there is a large number of leeches to be operated on, and it has, therefore, generally failed. The price of leeches, however, constantly increasing, gives daily additional interest to their preservation.

We are about to report in this paper the results of experiments made at Paris, commenced in a large public establishment, the Hôtel Dieu, and which are now employed with success in different hospitals of the capital.

The leeches employed were in such a state of repletion, that they may truly be said to have been diseased. To render them fit for re-application, two different processes have been adopted. The first consists in making them return the blood they have taken; the second, in placing them under circumstances favourable for digesting it. These two methods are known; but with their comparative value, and the precautions necessary for ensuring success, we have been but little acquainted.

Exposure to wood-smoke, washed, appeared to us at first preferable to every other method for effecting disgorgement; but without entering more into detail on this subject, we must conclude, that if means be employed which produce irritation in the leeches, they return almost the whole of the blood that they have sucked, but suffer from it so much that the greater number of them perish after the lapse of a short time. If, on the contrary, we make choice of substances that irritate slightly, the leeches are only partially disgorged, and soon recover; but when the time arrives at which they experience their epidemics, they fall in numbers to a disease which manifests itself externally by certain threads, appearing at once on different parts of the body. If these leeches be applied some days after they have been disgorged, some will fall almost immediately, having drawn but little blood, whilst others will remain on the patient, and, stimulated by warmth, will discharge blood afresh.

In a word, the disgorgement obtained by the use of irritating substances has never succeeded with us, notwithstanding much care and perseverance, and we, therefore, consider it as positively decided that this method is not capable of producing advantageous results. When M. Huzard employed for the purpose pressure between the fingers, he was led to conclude that it is a dangerous plan for the animal, and that those submitted to it languish and die soon after. "To perform it," said he, "an intelligent, adroit, person is required: I believe that it is a method of but little use. Some leeches are not even disgorged at all: the muscles of the stomach and æsophagus do not allow the blood to return by the air-vessels." Every one who has tried the experiment will no doubt agree with this opinion.

The idea of placing leeches which have been used in situations agreeing with their natural condition, in order to afford them time to digest the blood they have taken, has necessarily occurred to many persons, but it is found in practice to be attended with obstacles that it is difficult to avoid. We will relate what has been done respecting it at the Hôtel Dieu at Paris. A reservoir was constructed that appeared to combine all the necessary conditions. It consisted of a series of vessels filled with clay to the height of about two feet. This clay was covered with clear water to the height of one foot, and was continually renewed by a stream of water from the Seine. The whole was surrounded by a large mass of green turf; every arrange-

ment appeared reasonable, but success, however, did not crown our hopes. 3,000 leeches were deposited in it; some of these escaped into the adjoining garden, and all those that remained in the vessels perished in the course of three months. We then applied ourselves to the consideration of the most favourable conditions under which gorged leeches could be placed, to enable them to digest the blood without danger. For this purpose some were deposited in a vessel where we had previously placed, first, turf of various thicknesses slightly moistened; secondly, clay about the consistence of soft paste; and, lastly, clay diluted to a rather thin mass, and covered with a little water. A few of the leeches remained in the water and moist turf, and amongst those the mortality was the greatest. Others penetrated the diluted clay, and some of these kept the anterior part of their bodies out of the clay, and were observed to be constantly in motion. They also changed their skins, as also did those that remained in the water. These discharged some blood and died in great numbers. The greater part of the leeches penetrated into the thicker lay, where they remained to complete the digestion of the blood. Those that remained diseased rose to the surface, discharged some blood, and soon died. Very few dead ones were found in the clay, an observation already made by M. Achard, of Martinique.

Having thus ascertained the most favourable conditions for their preservation, we proceeded to realise these advantages in the following manner:— A cavity was made in a firm soil, and filled with white unctuous clay, of such a consistence that the leeches might easily penetrate it, taking the precaution, however, not to have it too soft. The soil had a slight inclination to enable the water to run off through a grating placed at the lowest part. In this manner the clay was moistened and not covered with water, except at the lower part. The clay being thus arranged, was inundated with water every day so as to wash it and moisten it slightly. Every day, also, the dead leeches that rose to the surface were removed. To prevent the escape of the leeches, the brink was surrounded with bricks, cemented with Roman cement, about a foot in height; it was then covered with a wooden frame that over-reached it about one foot, and to which were fixed, by means of nails, some pieces of cloth, about two and a half or three inches in breadth, unravelled at the lower part to the height of three quarters of an inch or an inch, and this was found to be a sufficient obstacle to the escape of the leeches. The aperture in the soil was twenty inches square, and about a foot deep. 6,500 leeches were placed in it; the experiment was commenced in the month of December; in the month of June following the leeches were taken out, after allowing the clay to dry to a firm paste. They were found in groups of two to six together, in small crevices, surrounded with a greenish matter. They were very lively, and were placed in water, which they immediately tinged green. In two or three days they were equal in appearance to the best new leeches, and superior to them in quality, for they all took quickly, and remained a longer time on the patient. From this it would appear that the question was decided; but we found afterwards, in operating on larger numbers, sufficient for the consumption of the Hôtel Dieu, that we were less fortunate. Two causes tended to this unfavourable result; on the one hand gorged leeches are more liable to disease than others; on the other, the blood that they discharge becomes by its decomposition an incessant cause of their destruction. Profiting by these failures, we then tried only a limited number of leeches, but notwithstanding the greatest care, we could only employ a fifth, or at most a fourth, of the number originally taken. Still, however, we had no doubt as to the possibility of ultimate success, and in this we were confirmed by the information obtained from M. Lesson, of the hospital at Rochefort. The arrangement there consists of two reservoirs or vessels of cut stone.

The bottom of these vessels is coated with a bed of blue clay about a foot

deep. In the centre is a beechwood frame, filled with the same clay in which are placed some aquatic plants; this mound is intended to serve as a protection for the leeches, which penetrate deeply into it, and produce their cocoons. The plants contribute to keep the water, which runs in at the top, fresh and supplied with air, whilst the thick water rendered impure with the blood, escapes by the pipe at the lower part of the vessel. Each vessel will contain 20,000 leeches, and in two years they have paid for the cost of their construction. Before placing the leeches in these vessels, M. Lesson immerses them in a small quantity of water in vessels running obliquely to the bottom. This water, replaced frequently by fresh, in the course of eight or ten days cleanses them from the external blood, and is charged with a quantity of mucous matter. The leech assimilates by degrees, or rejects the blood it has sucked, and after this time they are put in the reservoir, where they lose gradually their torpor under the influence of fresh water, comparative abstinence, and the elements of their natural habitations. At the hospital at Metz they have had for more than eight years a pond, in which they catch on an average from 16,000 to 18,000 leeches annually. This pond has the greatest resemblance to marshes and lakes. The water runs off but slowly, and is supplied anew by a stream running from one of the leats of the town. This reservoir is not cemented or coated with clay; the bottom is covered with slime and mud, in which the leeches obtain their support. Several aquatic plants are also disseminated in it. In spite of all the precautions taken, however, not more than a third of the gorged leeches that had been deposited there were retaken.

After numerous experiments, we give the preference to the method of pressure, if carefully managed, and we have obtained, at the Hôtel-Dieu, most satisfactory results, which have also been arrived at by others engaged in the investigation of the subject. We admit, in fact, that of all the methods we have tried, the one presenting the greatest advantages is that of slight pressure between the fingers. This process, which we at first rejected, and which in its most simple form we still consider as impracticable, is entirely changed in character when submitted to two important modifications: First, the tendency of leeches to disgorge under a slight excitement; secondly, the immersion of these animals in warm water, which keeps up a gentle and necessary stimulus, and gives to the blood a fluidity that renders its discharge more easy. These two conditions are indispensable in practice. As has been well remarked by M. Huzard, in his report, as well as by those who have considered the subject, the leeches, when pressed, contract the muscles of the mouth strongly, and numbers of them refuse so obstinately to return the blood, that their internal structure is destroyed before they will discharge it. The disgorged leeches are allowed to remain at rest in fresh water for some days, they are then applied again, and subjected afterwards to a second disgorgement. Many, however, are so debilitated that they bite without drawing much blood. Custom enables us to judge with much certainty, from their external appearance, whether they are capable of being immediately again employed, and if they are not they are placed in small artificial ponds, where they may continue at rest some time. Some will undergo two, three, or even more disgorgements, without being placed in the ponds.

After this brief exposition we shall give our observations more in detail, enumerating all the conditions necessary, each of which has contributed towards success.

1. *Choice of the Leeches.*—They should be those known as officinal leeches. Their size is determined; none should be taken weighing less than $15\frac{1}{2}$ grains, or more than 62 grains. A mass of leeches, weighing about two pounds $3\frac{1}{4}$ ounces avoirdupois, should contain very nearly 500. Gorged leeches should be very carefully excluded; the most simple plan of recog-

nizing them is to seize hold of the posterior part of the body of the leech, and pass it between the fingers with careful pressure ; the blood it contains is sent towards the mouth, where it accumulates in a mass, thus denoting its presence and quantity. When it is wished to ascertain exactly the latter, a certain number should be weighed, pressed strongly to expel the blood, and their weight again taken.

2. *Application of the Leeches.*—This has a great influence on the number of those which take, and should be undertaken by experienced persons.

3. *Manner of conveying them.*—At the Hôtel Dieu the leeches prescribed are sent to the bedside of every patient, in an earthen vessel covered with cloth, having a round hole in its centre, from which a little cloth cylinder or pipe, open at both ends, extends nearly to the bottom of the vessel. This is for the purpose of returning the leeches after they have fallen from the patient, as well as preventing loss, and the danger of their being placed in any impure vessels.

4. *Disgorgement of the Leeches.*—This should be done on the same day in which they are applied. A dozen are thrown into a solution consisting of 16 parts salt and 100 parts water. Each leech should be taken by its posterior extremity, and dipped in the water, which should be warm, but not more so than the hand can bear ; it should then be passed lightly between the fingers, when it will return without difficulty the blood it has taken. The leeches should then be set by in vessels containing fresh water, which should be renewed every twenty-four hours. In the course of eight or ten days, they will be fit for further use, and answer equally as well as new ones. When again used they are to be treated in the same manner ; and if it is found that they will not bear a third application, they are placed in the ponds.

5. *Description of the Artificial Ponds.*—They consist of stone vessels, internally coated over with Roman cement. These are filled with water, which is renewed immediately that it exhibits an alkaline reaction. This is an important condition, for alkaline matter is perhaps the most fatal to leeches. One of these vessels will be sufficient for the annual use of 50,000 leeches. Each vessel is divided into three compartments of the following dimensions : length, 39 feet 4½ inches ; breadth, 5 feet 7 inches ; depth, 2 feet 2 inches. The bottom of the vessel is covered with a stratum of softened clay 15½ inches thick, in which some aquatic plants and grasses are planted. The leeches bury themselves in the moist clay, from which they come out again when recovered. A constant stream of water is allowed to flow slowly through the vessel. There is very little mortality in these ponds, because its principal cause, the putrefaction of the blood discharged, is removed.

The construction of these vessels differs ; sometimes they are lined with zinc, but the presence of vegetables is, we think, always advantageous.

The use of proper vessels for the reproduction of leeches, is a subject we have not yet considered. We have seen it in active operation at the hospital of Angers, and for several years the stock thus obtained has been sufficient for the consumption of the hospital ; but notwithstanding this, there appears to be, at the present time, a sensible diminution, which may perhaps be attributed to the small size of the ponds, and the consequent want of nourishment for the leeches.—*Repertoire de Pharmacie.*

ADULTERATION OF SULPHATE OF QUININE.

Dr. F. L. Winkler has examined some sulphate of quinine, and found that only half of it was soluble in cold spirit of wine ; the residue consisting of carbonate of lime with some sulphate of quinine. The carbonate of lime constituted 40 per cent. of the commercial salt.—*Buchner's Repertorium.*

PREPARATION OF IODIDE OF ARSENIC.

BY DR. MEURER.

Arseniuretted hydrogen gas, prepared from arseniuret of zinc, is to be passed into a solution of one drachm of iodine in four ounces of spirit of wine. The gas is allowed to pass through the solution of iodine (in a place where the operator can be secure from the effect of the gas, as the outside of a window), till the solution is decolourized. A fresh quantity of iodine is then added, and the operation continued. If afterwards the clear solution becomes turbid, a small addition of iodine will render it clear again. The solution is then to be evaporated, when the iodide of arsenic, $As I_3$, separates in crystals, which appear under the microscope as sixsided tables.—*Pharm. Central Blatt*, No. 53, 1847.

ON CINCHONA BARKS AND QUINOIDINE.

BY WINKLER.

The author has again examined four remarkable second sorts of yellow bark (*Cinchona regia*), and received from London eight new sorts, which had just arrived from Bolivia. A great part of the yellow bark now sold in London is not genuine, and contains cinchonine only. True yellow bark can be obtained only with difficulty. On the other hand, there is now a sort in commerce which scarcely resembles genuine yellow bark, but which contains as much quinine as the best yellow bark. The quinoidine contains, besides the amorphous quinine, also amorphous cinchonine. The author obtained the latter both from quinoidine and cinchonine.—*Pharmaceutical Central Blatt*, No. 51, 1847.

CHEMICAL SOCIETY.

March 6th.—Mr. E. F. Teschemacher in the chair. Dr. Playfair exhibited an aneroid barometer, with a table of the results of a set of comparative observations made against a standard barometer, to show its close agreement.

A notice was read by Mr. Warington, "*On the Manufacture of Prussian blue, known in commerce as Turnbull's blue.*" After alluding to the series of experiments which had led to what the author considered a successful result, the process necessary for its production was given in detail. It consisted in first forming the white Prussian blue from a solution of protosulphate of iron by ferrocyanide of potassium, and subsequently acting upon this with oxidizing agents, such as chromic acid, chloric acid, or solutions of the salts of certain metals in a high state of oxidation, by which this beautiful colour was developed.

March 20th.—The President in the chair. Two papers were read by Messrs. Joule and Playfair "*On Atomic Volume,*" and "*On the Expansion of Salts by Heat.*" The authors stated, that in many hydrated salts, the space occupied is due only to the water attached to the acid; and that the acid, and in some instances, both the acid and base, cease to occupy appreciable bulk. The phosphates and arseniates, containing twenty-four equivalents of water, occupy of themselves no space, their volume having been merged in that of the attached water, which invariably takes up the same bulk as if it were frozen into ice. Cane, grape, and milk sugar are included in this class; the carbon in these bodies having disappeared, so far as regards its appreciable

volume, the bulk of the sugars consisting only of that due to the water contained in them. The sulphates of copper, zinc, iron, and magnesia, assume the bulk due to their water and to the oxide, the acid occupying no appreciable space. In the highly complex atoms of the alums, the same result is found, the four atoms of acid in their salts having become merged in the volume of their attached water. The volumes of the water frozen into ice, and of the two bases, give the total space occupied by the alums, leaving nothing for the acid. In all cases, the water attached to the highly hydrated salts affects the volume of ice, and not of liquid water. The number of unit volumes in a base generally determined the number of atoms of water in its salt; although in the first class of compounds, where the volume of the base and acid both disappeared, the number of atoms of water appears to be determined by the factor representing the unit volumes in the acid. The authors examined the expansion of a large series of salts and oxides, amounting to forty-three varieties, but the results of the investigation are too technical for abstract. The increase in bulk of salts between the freezing and boiling points of water, is, in general, inconsiderable. The body which was found to be most expansible by heat, was oxalic acid, and that least so was peroxide of tin.

DETECTION OF FORGERY BY CHEMICAL PROCESSES.

In a case which lately came before the Vice-Chancellor's Court, an application was made to permit Dr. Ure and Dr. Pereira to test and examine by chemical processes, a certain deed which it was alleged had been altered by having some words discharged from the said paper in relation to the price for which a contract was to be undertaken. The affidavit of Drs. Ure and Pereira was read, in which they swore, that, "after minute examination with the aid of optical glasses, in their judgments the wire-marks of the paper seemed to be smoother at the blank than elsewhere; that from the whole appearance of the blank portion of the paper, they both believed that at that portion of the agreement some writing might have been discharged by the action of some acid or other chemical agent; that by the use and aid of chemical agents it might possibly be established and proved whether any and what written words had been discharged or attempted to be discharged from the blank portion of the agreement, if there were words formerly written thereon; and that such chemical tests would in no way affect or injure the agreement." A passage was then read from the *Pharmaceutical Journal*, showing that writing ink can be discharged from paper by the application of a solution of muriatic acid and chloride of soda, and made re-apparent by the application of a solution of ferrocyanide of potassium, called yellow prussiate of potash.

On the other side it was alleged that the part of the writing said to have been discharged had been purposely left blank.

The Vice-Chancellor declined to make the order.—*Medical Gazette.*

LONDON COUNTY COURT.

HOOPER *v.* SUTTON.

This was an action brought by Mr. William Hooper, 1, Pall Mall East, Chemist, against Messrs. William Sutton and Co., of Bow Churchyard, wholesale Patent Medicine vendors, to recover the sum of

£10 14*s.* 3*d.*, Mr. Hooper's charge for 3lbs. 13oz. of chloroform, at 56*s.* per pound.

Mr. Dodd, of Great Marlborough Street, appeared as attorney for the plaintiff, and Mr. Lott as attorney for the defendants.

Mr. Dodd having proved the order and delivery of the article by Mr. Hooper, the plaintiff, who swore that he had first introduced it into London, and that it was his own manufacture, and that the price charged for it, 3*s.* 6*d.* an ounce, was a reasonable and fair price for it. Mr. Hooper, on being cross-examined by Mr. Lott, admitted that he had advertised in the *Pharmaceutical Journal* that he had been favoured with Dr. Simpson's formula, and would supply it in any quantity.—On being further questioned by Mr. Lott, the witness admitted that he had about this time purchased perchloride of Messrs. Heathfield and Burgess, and of Mr. Morson—could not recollect the price.

Mr. Lott stated that he appeared for Messrs. Sutton and Co., one of the oldest and most respectable houses in the trade, established upwards of a century, who, while they had always punctually paid every just demand upon them, had the moral courage to resist that which they considered an improper one. It appeared that Messrs. Sutton had an order from a country customer, a bookseller, for a *quart* of this, *Hooper's* Perchloride, being quite unaware of the price or quantity. A quart in these matters denoting weight, and not measure, they felt convinced that their customer, the bookseller, had made a mistake, wrote him immediately to that effect, and relying upon the custom of the trade, took the earliest opportunity of returning the Perchloride (which had arrived late on Saturday evening), viz., early on Monday morning, to Mr. Hooper, but who refused to take it back, and eventually issued this summons. Messrs. Sutton were right in their conjecture as to their customer having been mistaken, as he wrote to them immediately, informing them they must not send it. Messrs. Sutton, moreover, resisted this demand, on the ground that this was not Mr. Hooper's manufacture, and that he was charging 1*s.* 6*d.* an ounce more than he himself paid for it, and more than it could be obtained for at other places.

Mr. Lott then called Mr. Christian, one of the managing assistants in the house of Savory and Moore, who proved that it was the custom of the trade to take goods back under such circumstances, if returned at once. Mr. Christian proved that on the 25th of November, two days before this order was given, they were paying Mr. Morson only 2*s.* 6*d* an ounce for it.

Mr. Burgess, of the firm of Heathfield and Burgess, proved that on the 24th, 25th, and 27th November, they were selling Chloroform to Mr. Hooper at 2*s.* per ounce, with a discount of five per cent. On being examined as to the custom of the trade, he considered it an open question.

Mr. George Jones, the managing clerk of Messrs. Sutton, proved the custom of the trade to be as deposed to by the first witness, also proved the immediate return of the goods—the refusal of Mr. Hooper to take them back, and his remonstrance with him thereupon.

The jury found a verdict for the plaintiff for the full amount claimed.

NOTICES OF BOOKS.

Selecta e Prescriptis: *Selections from Prescriptions, containing Lists of the Terms, Phrases, Contractions, and Abbreviations, used in Prescriptions, with Explanatory Notes; the Grammatical Construction of Prescriptions; Rules for the Pronunciation of Pharmaceutical Terms; a Prosodiacal Vocabulary of the Names of Drugs, &c.; and a Series of Abbreviated Prescriptions, illustrating the use of the preceding terms; to which is added a* Key, *containing the Prescriptions in an Unabbreviated Form, with a literal Translation. Intended for the use of Medical and Pharmaceutical Students.* Tenth Edition, much improved. London: S. Highley, Fleet Street. 12mo, pp. 325.

A work which has passed through nine editions already, can well afford to stand upon its own merits without any lengthened recommendation. We need only repeat what we have stated on former occasions, that it is a most valuable work for the student, with this addition, that in its present form it is much improved. A student, who has made himself acquainted with the contents of this little book, could seldom if ever be puzzled with the terms of a prescription. The only suggestion we have to offer to the author, in order to make the work quite complete, is the addition of a series of *fac-simile* autographs to accustom the student to the autography of prescriptions which is occasionally more perplexing than the words themselves. We look forward to this supplementary matter in the eleventh edition.

The Microscopic Anatomy of the Human Body in Health and Disease. *Illustrated with numerous Drawings in Colour.* By Arthur Hill Hassell, Author of a "History of the British Fresh Water Algæ," F.L.S., &c. London: Samuel Highley.

Twelve of the fourteen parts which are to complete this useful work have now been published. They contain forty-eight plates, each including a considerable number of figures, excellently and accurately drawn, and of which many are coloured. To professional men and others interested in the microscopic structure of the animal body, the work will be found highly useful, and to them we strongly recommend it. Considering the immense amount of illustration, the work is really very cheap. We should be glad to see the publication of sets of microscopic objects, illustrative of the various subjects treated of in this work. We think they would form useful companions to Mr. Hassall's book.

A Treatise on Diet and Regimen. By William Henry Robertson, M.D., Physician to the Buxton Bath Charity. Fourth Edition, rewritten and much enlarged. Parts I. to IV. (To be completed in Six Parts). London: John Churchill.

Chemical Manipulation and Analysis, Qualitative and Quantitative. By Henry M. Noad. Parts I., II., and III., being a Part of the New Series of the Library of Useful Knowledge. 8vo, pp. 32 each Part.

This is a useful work for the Chemical Student, and we intend to revert to it in our next number.

The Southern Journal of Medicine and Pharmacy. Edited by P. C. Gaillard, M.D., and H. U. De Saussure, M.D. Vol. II., No. 6. Charleston.

Elements of Chemistry, *including the Applications of the Science to the Arts.* By Thomas Graham, F.R.S. Part II. of Second Edition.

This will be noticed next month.

TO CORRESPONDENTS.

"*Celsus.*"—(1.) *Dalby's Carminative.*

℞	Carbonate of Magnesia	℈ ij.
	Oil of Peppermint	♏ j.
	" Nutmegs	♏ ij.
	" Anniseed	♏ iij.
	Tincture of Castor	♏ xxx.
	" Asafœtida	♏ xv.
	" Opium	♏ v.
	Spirit of Pennyroyal	♏ xv.
	Compound Tincture of Cardamoms	♏ xxx.
	Peppermint Water	f℥ ij.

Mix

(2.) Oil is sometimes bleached for making pommade, &c., by exposing it to the light for some time with a piece of metallic lead suspended in it.—(3.) *Writing Ink.*

℞	Bruised Galls	℔ij.
	Common Copperas	℔v.
	Gum Arabic	℔iv.
	Water	Cong. xij.
	Creasote	℥ij.

Boil the nutgalls in three-fourths of the water for an hour, then strain. Dissolve the gum in twice its weight of hot water, and add it to the decoction. Dissolve the copperas in the remainder of the water, mix the liquors together, and make up the quantity to twelve gallons. Finally, stir in the creasote.

"*A Member.*"—(1.) We cannot account for the *Ext. Col. Co.* made in the manner described causing more pain than is usual, and think it must depend on the quality of the ingredients used rather than the method of combining them. The directions of the Pharmacopœia are good, and ought to be followed.—(2.) Mr. Redwood's work on *Pharmaceutical Manipulations* is not yet completed, having been delayed by unavoidable circumstances.

J. C. S. (*Chipping*).—(1.) Marking ink without preparation, see vol. vi., page 419.—(2.) A concentrated solution of ammoniacum is sold by some of the wholesale Druggists, but we do not know how it is prepared.

"*Spes.*"—Subnitrate of mercury is obtained by dissolving mercury in strong nitric acid, with heat so as to form a pernitrate, then pouring this into a large quantity of water, heating the mixture, and collecting the yellow precipitate. This is sometimes, but *very improperly*, used for making *Ung. Hydrarg. Nitr.*

M., A.P.S. (*Manchester*).—(1.) On heating acetate of lead in the manner described, the salt undergoes decomposition, vapours of acetone and other gaseous products are given off, and these are inflammable, and will burn on the surface of the fused and partly decomposed salt.—(2.) The Examinations for the admission of Associates, &c., take place on the third Tuesday in each month.

"*A Registered Apprentice.*"—No. 2 does not appear to us to be the officinal plant, for which no substitute should be employed; but it is impossible to speak decisively of a species from examination of one or two leaves, as these organs vary in shape on different parts of the same plant. The Society's herbarium of indigenous plants is incomplete.

"*Tyro-Chemicus.*"—Creasote may be conveniently made into pills with crumbs of bread, and administered in doses of half a drop.

"*Stultus.*"—The terms "density" and "specific gravity" are generally used as synonymous terms, but they have, strictly, different significations, as stated by Mr. Fownes, in his *Manual.*

M.P.S.—The silver may be recovered by drying and calcining the mass, treating the residue with nitric acid, precipitating with hydrochloric acid, washing the precipitated chloride of silver with water, boiling it with strong solution of caustic potash, and finally reducing it by heating the resulting powder in a crucible with a mixture of carbonate of potash and borax.

M.P.S. (*Chatham*).—Glycerin has been used as an external application in some cutaneous diseases, and for burns, scalds, &c., for protecting the parts to which it is applied from the action of the air.

"*Vinum.*"—It is a bad specimen, and contains alum.

J. P. B.—Yes.

"*Amator Scientiæ.*"—(1.) *Hoblyn's Dictionary of Medical Terms* will be found to contain the information alluded to.—(2.) The question is a medical one, and should be sent to a medical journal.

"*Molestor.*"—Brande's *Manual of Chemistry.*

A.P.S. (*Bristol*), and "*A Constant Reader.*"—The new edition of *Gray's Supplement*, by Mr. Redwood, is now ready, and may be had through the booksellers. A great quantity of new matter has been added, including several hundred new formulæ, but a closer typography having been adopted, the size of the book is not increased.

C. W. (*Torquay*).—Mr. Morton's apparatus for detecting arsenic resembles Marsh's apparatus, but has two wires inserted in the lower part of the glass, which are connected with a galvanic battery, by which means the water is decomposed. The point from which the hydrogen is disengaged is under the inverted cone through which this gas escapes.

Y. Y. J.—Crystals of sulphate of potash are sometimes used in smelling bottles with aromatic vinegar instead of a sponge.

"*A Constant Subscriber.*"—Physicians usually subscribe merely their initials to prescriptions. Surgeons either write their names in full, or add to the initials the word "Chir:"—(Chirurgicus).

"*Infelix*" suggests, in reference to the Medicine Stamp Act, that it would be advisable to obtain an alteration of the law, obliging those who issue proprietary medicines to publish their formulæ. This regulation would operate as a check upon the impositions so frequently practised.

R. C., M.R.S.—The nitric acid of commerce is generally made from nitrate of soda. It is identical with the acid made from nitrate of potash, consequently answers as well for the purpose alluded to.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. XI.—MAY 1st, 1848.

THE INEQUALITY IN THE RATES OF DUTY ON BRITISH SPIRIT.

We have on several occasions alluded to the injury inflicted on the English manufacturer by the inequality in the rates of duty on British spirit. Those who are the sufferers from this circumstance have made frequent appeals for redress, and are not easily persuaded into the belief that it is consistent with justice and sound policy to impose a duty of 7*s.* 10*d.* a gallon in England, while on the other side of the Tweed the duty is 3*s.* 8*d.*, and in Ireland only 2*s.* 8*d.*

The maintenance of a strong armed force on the border, besides the coast-guard, entails an additional expenditure on the collection of the revenue, while the temptation to evade the law is a fertile source of crime and demoralization; and the honest dealer and manufacturer are continually brought into unequal competition with persons who have successfully eluded the vigilance of the excise officers.

It has been suggested that the introduction of one uniform medium duty throughout Great Britain and Ireland, would be the most effectual remedy for these evils, and would be no more than an act of justice to those parties who are now suffering from the unequal pressure.

It is argued, however, on the other side, that no practicable equalization or modification of the rates of duty could be introduced without seriously diminishing the amount of the revenue. The following calculations show what would be the result of a modification of the duty according to five distinct propositions, supposing the consumption to remain the same as it is at present:—

PRESENT DUTY.	£
England .....at 7*s.* 10*d.* per gallon...	3,595,315
Scotland .....at 3*s.* 8*d.* " " ...	1,278,766
Ireland .....at 2*s.* 8*d.* " " ...	1,060,276
	£5,934,357

England .....at 5*s.* per gallon...	2,294,882
Scotland ..... " " " ...	1,743,772
Ireland ..... " " " ...	1,988,019
	6,026,673
Present duty.....	5,934,357
Gain.....	£ 92,316

England and Scotland .....at 5*s.* per gallon...	4,038,654
Ireland as at present .....at 2*s.* 8*d.* " ...	1,060,276
	5,098,930
Present duty.....	5,934,357
Loss.....	£ 835,427

England and Scotland .....at 6*s.* per gallon...	4,846,386
Ireland as at present .....at 2*s.* 8*d.* " ...	1,060,276
	5,906,662
Present duty.....	5,934,357
Loss.....	£ 27,695

England and Scotland .....at 4*s.* per gallon...	3,230,924
Ireland as at present .....at 2*s.* 8*d.* " ...	1,060,276
	4,291,200
Present duty.....	5,934,357
Loss.....	£1,643,157

England, Scotland, and Ireland, at 4*s.* per gallon...	4,821,339
Present duty.....	5,934,357
Loss.....	£1,113,018

These calculations being founded on the hypothesis that the amount of spirit brought to charge would not be affected by the contemplated alteration in the rates of duty, it may be as well to take into consideration the following results, which have been ascertained as having succeeded increases and decreases of the rate of duty on spirit in the three kingdoms respectively.

In *England*, in the year 1825, the duty being equal to 11*s.* 8¼*d.* per imperial gallon, the quantity of British spirit brought to charge for consumption was 3,684,000 gallons.

In 1826, the duty being reduced to 7*s.* per imperial gallon, the quantity brought to charge was 7,407,000 gallons; and at 7*s.* 10*d.* in 1845 the quantity amounted to 9,076,000 gallons.

In *Scotland*, in the years 1815 and 1816 the Lowland and Highland duty being equalized at a rate equivalent to 9*s.* 4½*d.* per imperial gallon, the quantity brought to charge was, for the first of these years, 1,591,000 gallons, and, for the second, only 918,000 gallons, making an average of 1,254,000 for each of the two years; while in 1818 the rate of duty being reduced to 6*s.* 2*d.* per gallon, the quantity brought to charge increased to 2,066,000 gallons, and in 1823 amounted to 2,303,000 gallons.

In 1825, the duty having been reduced to a rate equivalent to 2*s.* 4¾*d.* per imperial gallon, the quantity brought to charge rose to 5,981,000 gallons, an increase of more than 100 per cent.

The rate of duty has been since progressively raised to 3*s.* 8*d.* per gallon; and in twenty years the quantity brought to charge annually has only increased to 6,441,000 in 1845.

In *Ireland*, in the year 1811, the duty having been lowered to a rate equivalent to 2*s.* 6½*d.* per imperial gallon, the quantity brought to charge was 6,378,000 gallons.

The duty was subsequently raised to rates equivalent to 5*s.* 1¼*d.*, 5*s.* 7¼*d.*, 6*s.* 1¼*d.* per imperial gallon; and in 1822, the quantity brought to change was reduced to 2,910,000 gallons.

In 1825, the rate having been reduced to 2*s.* 4¾*d.* per imperial gallon, the quantity brought to charge was increased to 9,262,000 gallons.

The rate of duty was subsequently progressively increased to 3*s.* 4*d.* per imperial gallon; and the quantity brought to charge was reduced in 1833 to 8,168,000 gallons.

On the duty being again reduced to 2*s.* 4*d.*, the quantity charged with duty rose at once in 1835 to 11,381,000, and attained its maximum of 12,296,000 gallons in 1838.

The duty was afterwards raised to 2*s.* 8*d.* per gallon, and the quantity was reduced to 6,485,000 in 1841. The temperance movement had probably some influence in this reduction.

In 1842 the duty was raised from 2*s.* 8*d.* to 3*s.* 8*d.*; and the quantity charged with duty was reduced from 6,528,000 gallons to 4,813,000 gallons,

The duty being again reduced to 2*s.* 8*d.*, the quantity charged with duty in 1845 amounted to 7,605,000 gallons.

From the above statement of facts, it appears that the rate of duty has a direct influence on the quantity of spirit brought to charge; that there is a limit beyond which the duty cannot be raised with

advantage to the revenue ; and that this limit differs in the three kingdoms.

The rates of duty at present in force are not founded on caprice or accident, but have resulted from an observation of the various circumstances attending the changes which have from time to time been made. It appears to be the object of the legislature to fix the duty at that point which will secure the greatest amount of revenue at the smallest cost, avoiding an extravagant duty, which would offer too much temptation to the smuggler, and also the opposite extreme, which would promote intoxication. It is found that England will bear a much higher duty than either Scotland or Ireland. This probably arises in part from local circumstances, but chiefly from the habits of the people, and the difference in the kind of spirit which they use as a beverage. The spirit chiefly used in England is gin, which is a compound requiring for its proper manufacture a large rectifying establishment, while the whisky, which is drank in Scotland and Ireland, is a plain spirit, obtainable with comparative ease on the small scale.

The circumstance most to be feared in the event of an equalization of the rates of duty taking place, is that the increase in the duty in Scotland and Ireland might induce the illicit distillers to redouble their energies, so as to defy the vigilance of the officers. We are told that the addition of 2*s.* to the present duty in Ireland would inevitably produce this effect to a serious extent. It has also been considered a doubtful question whether the amount of spirit charged with duty in England would increase on the reduction of the duty, so as to compensate for the loss per gallon on the present revenue. On this point opinions may differ, and the fact can only be ascertained by experiment.

We should be glad to see the experiment tried, and we have every reason to believe that a disposition prevails on the part of the Board of Excise to introduce any improvement in the regulations which may be desired, provided always that such change does not involve a serious loss of revenue. The balance-sheet is to the Board a primary object—a return of nearly six millions forming an important item in the assets of the Chancellor of the Exchequer.

THE BENEVOLENT FUND DINNER.

As the time approaches for commencing the distribution from the Benevolent Fund, and the regulations advance towards completion, the interest in the object appears to increase. It is said that "Coming events cast their shadows before." In the present instance, the coming event casts something more substantial than shadows, and the approaching festival is ushered in by numerous subscriptions, which are satisfactory indications of the zeal and good will of our brethren in the country.

Among other instances of this activity in the cause of benevolence, we have much pleasure in publishing the following report of proceedings at Norwich, Yarmouth, and Lynn, the result of two meetings held on the 31st of March and the 4th of April. Mr. George Cubitt, one of our Members of Council, supported by Mr. Robert Fitch and Mr. Robert R. Priest, issued the invitations, which appear to have met with a warm response :—

REPORT.

"At a meeting, held at the Norfolk Hotel (Norwich), the following Resolutions were proposed and carried unanimously :—

"Proposed—That a society be formed, called the NORWICH DRUGGISTS' FRIENDLY SOCIETY, for the purpose of aiding the Benevolent Fund of the Pharmaceutical Society of Great Britain.

"Proposed—That an Annual Subscription of *5s.* from masters, and *2s. 6d.* from assistants and apprentices, constitute them members of the Society ; but that by the law of the Central Society, no person can vote in the distribution of the Fund whose subscription is less than *5s.* per year.

"Proposed—That we communicate with the Druggists in the principal towns of Norfolk and Suffolk, and in our own immediate neighbourhood, with the view, that by similar means a permanent fund may be secured to assist Druggists and their families in time of adversity.

"Proposed—That the balance in the Treasurer's hands be paid over to the Benevolent Fund.

"In behalf of the meeting,

"G. CUBITT, *Secretary.*"

The list, which is not yet complete, contains already about forty names in Norwich and Yarmouth.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

COUNCIL MEETING, APRIL 5th, 1848.

General Rules for regulating the distribution of relief from the Benevolent Fund, as prepared and presented by a Committee appointed for that purpose, were read by the Secretary, when it was—

Moved by Mr. Charles S. Tosswill
Seconded by Mr. P. Squire—
Resolved unanimously,

"That the General Rules now read be adopted for regulating the distribution of the Benevolent Fund; and to which all Applicants must conform in presenting their cases for relief."

GENERAL RULES.

1. This fund is designed for the benefit of distressed Members, of Associates of the Society, or their Widows or Orphans, by annual relief or temporary asssistance.

2. Annual relief is limited to Members and Associates who have been four years on the books of the Society, or the Widows of such Members or Associates: all Candidates must have attained the age of sixty years, and the relief is regulated according to the following scale:—£15 per annum from the age of sixty to sixty-eight, £20 per annum from the age of sixty-eight to seventy-three, £25 per annum from the age of seventy-three and upwards.

3. Every Member of the Society who may not be in the receipt of, nor an applicant for, relief out of the Benevolent Fund, is entitled to twenty votes.

Every Associate who may not be in the receipt of, nor an applicant for, the like relief, is entitled to ten votes.

Every person who shall at any one time have given to the Benevolent Fund the sum of five pounds, is entitled for life to twenty votes, and the like number of votes for every similar sum of five pounds given in like manner.

Every person who shall at any time within the space of a year before the Election have subscribed the sum of five shillings and upwards, is entitled for that year to ten votes for every sum of five shillings so subscribed by him.

A legacy of fifty pounds entitles the first-named executor to a life privilege of twenty votes at every election of pensioners; a legacy of £100 entitles to the like privilege of forty votes; and should a legacy exceed that amount, forty votes more are granted for each additional £100, the privilege commencing at the first election after the payment of the bequest.

4. Every person voting at an annual election, who may be entitled to vote in either of the several characters, is entitled to vote in each of such characters.

5. Any person may vote by proxy, such proxy being a person entitled to vote.

6. In the event of an equality of votes, the chairman shall have a casting vote.

7. No person possessing an income of thirty pounds per annum, shall be eligible to this fund.

8. Members and Associates as petitioners for relief from this fund, shall produce a certificate of baptism, or such other evidence of their age as shall be satisfactory to the Council of the Society—shall state the time and place or places in which they have been engaged in the business of a Chemist and Druggist, whether on their own account or otherwise—how their misfortunes originated, and when—their present means of subsistence, and from what source it arises—the number of those (if any) dependent upon them for support.

Widows shall produce evidence of their age—the certificate of marriage, and the certificate of the burial of the husband, or such evidence as shall satisfy the Council on these points—the period during which the husband was in the trade, and where—the cause of misfortune—the present means of subsistence, and from what source it arises—the number of children (if any) dependent on them for support.

9. In all petitions for assistance from this fund, it is required that the truth of the statements be certified by at least four Members of the Society, or housekeepers who are subscribers to the Fund, and two of whom are personally acquainted with the facts of the case.

10. The Council after due investigation, if satisfied that the case is an eligible one, shall decide whether the relief to be afforded shall be temporary or annual, and if the latter, the case shall be put on the list of approved candidates for election in the month of November.

11. As soon as the Council have decided upon the case, the petitioner for annual relief will receive written information from the Secretary ; and no cards or canvassing letters are to be sent to the Members or Associates of the Society, or to the Subscribers to the Fund, until the applicant has received official notice of the acceptance of the petition by the Council.

12. Annual relief will be forfeited by misconduct, or may be terminated by the Council, should the improved circumstances of the pensioner at any time disqualify him or her to receive the benefits of this Fund.

13. Candidates stand in rotation on the books of the Society in the order of their admission, and the amount of annual assistance is regulated by the age of the candidate when elected, and is never increased under any circumstances.

14. Candidates are particularly requested to communicate to the Secretary any changes in their places of residence. Candidates must not be present at the election.

15. No balloting paper is issued until the subscription to the Pharmaceutical Society or to the Benevolent Fund is paid.

16. Temporary assistance will be afforded by the Council, at their discretion, to distressed Members or Associates who have been four years on the books of the Society ; or the widows or orphans of such Members or Associates.

17. Members, or Associates, or Widows, applying for relief, must furnish a full statement of their case, accompanied by certificates, as required by rules 8 and 9.

Orphans applying (who are eligible only for temporary assistance) shall state their age, and afford satisfactory evidence of the marriage and burial of their parents, and whether any means of subsistence have been left them, and its amount, with the source from whence it arises, accompanied by a certificate signed as required by rule 9.

FORM OF CERTIFICATE

To be signed by not less than Four Members of the Society, or by Four Housekeepers subscribing to the Fund.

We, the undersigned Members of the Pharmaceutical Society, or Subscribers to the Benevolent Fund, being Housekeepers, do hereby certify, that we have been personally acquainted with
for the number of years specified against our respective names, and can affirm that the particulars stated in Petition are, to the best of our knowledge, strictly true.

NAMES.	Number of Years the Petitioner has been known.	RESIDENCES.

The Council are ready to receive applications for assistance, in accordance with the foregoing regulations; and those from Candidates for annual relief, to be included in the list from which the election shall take place in November next, must be forwarded on or before the 24th of June preceding.

T. N. R. Morson, V.P., *Chairman.*

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in April.

MEMBERS.

Banbury	Gardner, Robert, High Street
Bishop Stortford .	Morse, Charles, Bath, North Street
Blackburn . . .	Binsley, James, Church Street
Bolton	Hart, James, White Lion Brow
Brighton	Atlee, David, Richmond Place
Edinburgh . . .	Shaw, John, 11, Elm Row
Leeds	Smeeton, Edward, W. Albion Row
London	Bluett, W., Reginald, 190, Sloane Street
	Cooper, William Temple, 26, Oxford St.
	Curtis, Frederick, 15, Crawford Street
	Gigner, John, 1, Sidney Place, King's Road, Chelsea
	Johnson, Frederick, Red Lion Street, Holborn

LONDON	Kernot, George Charles, Chrisp Street, Poplar New Town
	Philipps, Wm. T., 26, Wardour Street
	Potter, Samuel, Commercial Road East
	Robinson, George Perks, 19, Brick Lane
	Sadler, William, 13, High Street, Norton Folgate
MARGATE	Davis, John Oliver, 16, High Street
NAILSWORTH . . .	Smith, William
NEWCASTLE-ON-TYNE	Proctor, William, 32, Collingwood St.
PLYMOUTH . . . ,	Burdwood, James, 30, Frankfort Street
PORTSMOUTH . . .	Cockell William Henry, High Street
	Smith, John, 83, Union Road
ROTHWELL	Gray, William, High Street
RUNCORN	Lewis, Edward, Bridge Street
ST. IVES	Taylor, John Usher, Sheep Market

MAJOR EXAMINATIONS.

Baeër, Gustave Edouard . .	Strasbourg
Gray, Thomas	Melton
Lawson, William	Settle, Yorkshire

MINOR EXAMINATIONS.

Greaves, Edmund	Leighton Buzzard
Marshall, John	8, High Street, Stepney

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Brewster, George C. . .	Mr. Palgrave . . .	Bedford
Clarke, Thomas V. . . .	Messrs. Gunton & Co,	Southwark
Clifford, John R. S.. . .	Mr. Strange . . .	Pimlico
*Ferguson, William E. . .	Mr. Phythian . . .	Rusholme
Gooer, Robert M. . . .	Mr. Shadford . .	Spalding
*Haines, Frederick . . .	Mr. Witherington .	Worcester
Harvey, William B. . .	Mr. Harvey . . .	Yeovil
Jones, Hugh Lloyd . . .	Mr. Bowers . . .	Chester
Long, Henry	Mr. Gamson . . .	Moorgate
Longstaff, Thomas . . .	Ritson and Sons . .	Sunderland
Maunder, Charles F. . .	Mr. Schacht . . .	Clifton
Turner, William	Mr. Ball	Liverpool

Erratum.—March—*For* Banks, Birmingham, *read* Bedford.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE VINEGARS OF COMMERCE, AND THEIR ANALYSIS.

BY ANDREW URE, M.D., F.R.S., &c. &c.

THERE is probably no article of extensive consumption in this country so subject to variation in its strength and purity as vinegar. The sour liquor manufactured from malt contains generally so much gluten as to be very prone to putrefy, were not this offensive change counteracted by the addition of oil of vitriol—an adulteration sanctioned by law. This is a miserable shift, or pretended necessity, in the present advanced state of organic Chemistry. It offers besides an easy source of fraud, since neither the retailers nor consumers of the article are competent to distinguish how much of the sourness is derived from the mild fermented, and how much from the corrosive mineral, acid. All the pickles in which our *bourgeoisie* so much delight, are polluted by the same sophistication. Not long since, a sample of vinegar was submitted to me for examination, said to be that supplied by contract to the British navy. I found it to contain little more than half the fair amount of *proof* vinegar, with much gluten, and a copious supplement of oil of vitriol. Our Admiralty might buy such stuff at a low price; but it was dear at nothing, since it would derange all ordinary stomachs.

The strength of vinegar, as of acids in general, may be determined by the proportion of alkali which a given weight of it will saturate. For this purpose I give the preference to water of pure ammonia, of specific gravity 0.992, because 1000 water-grain measures of it neutralize 60 grains of real acetic acid hydrate, which contains 1 atom of water=9, and 1 atom dry acid=51. Our Excise proof vinegar contains 5 per cent. of this latter acid, and therefore nearly 6 of the hydrated acid. Hence, 1000 water-grain measures of proof vinegar will neutralize 1000 water-grain measures of the test-water of ammonia. If 1000 water-grain measures of another vinegar neutralize only 600 grain-measures, that vinegar is 40 per cent. under proof. But a further deduction must be made on account of the mineral acidity by the following method:—Evaporate 1000 water-grain measures of the vinegar, in a porcelain or glass basin, by the heat of a brine-bath (225° F.); weigh the residuum, then wash it with alcohol of 0.840, and filter. The sulphuric acid will pass through in the spirit, and may be estimated either by the test ammonia, by evaporating the spirit and weighing what

remains, or by precipitation with any soluble barytic salt, and determining the amount of sulphate of barytes. The gluten may be ascertained by ignition of the filter, previously weighed dry; the saline or alkaline impurities will remain for examination. The fixed alkali will be probably soda, from acetate of soda, occasionally present in wood vinegar, which is sometimes used to strengthen decayed or ill-fermented malt vinegar.

The treatment of the residuum with alcohol above prescribed, is essential to distinguish between sulphuric acid and sulphate of lime, which latter substance is unavoidably present in the vinegars of such factories as are supplied with gypseous well waters. Sulphate of lime is insoluble in spirits of the above strength.

Weak vinegars have been occasionally fortified with nitric or muriatic acid. The former is detected by letting fall a drop or two of sulphate of indigo into the vinegar, and applying heat; when the blue tint will change to yellow-brown. To detect muriatic acid, distil a portion of the vinegar, and introduce into the receiver a few drops of nitrate of silver. A white curdy precipitate will betray the muriatic acid.

The tendency to putrefaction in malt vinegars, may be obviated by oxidizing the gluten, and thus rendering it insoluble. It is to this plan of discharging the gluten in the Bavarian beer process, that the limpidity and keeping quality of this wholesome beverage are justly ascribed by Liebig, and other great German chemists. A like oxidizement of malt vinegar is accomplished in the modern improvements of Ham's patent method of acetification, as described in my paper on Acetic Acid in the December number of this Journal (vol. vii, p. 286). I have recently had an opportunity of verifying the truth of this proposition, in the minute analysis of malt vinegars made in that way on the great scale, at the works of Messrs. Hill, Evans, and Williams, of Worcester, which vinegars are well-flavoured, and keep well, without one drop of sulphuric acid. A malt liquor thus perfectly acetified, must be far more wholesome than our ordinary half-fermented vitriol-holding vinegars, and preferable even to much of the pretended wine-vinegar of France, fortified too often by the more or less acrimonious acid distilled from wood.

24, *Bloomsbury Square, April* 18, 1848.

Erratum.—In Dr. Ure's notice of Petroleum, in last month's Journal, page 485, for *Amianth* read *Amiano.*

NOTES ON THE ANÆSTHETIC EFFECTS OF CHLORIDE OF HYDROCARBON, NITRATE OF ETHYLE, BENZIN, ALDEHYDE, AND BISULPHURET OF CARBON.

BY J. Y. SIMPSON, M.D.,
Professor of Midwifery in the University of Edinburgh.

During the last few months, two or three different substances have been mentioned as additional anæsthetic agents; but our medical journals have afforded little or no detailed notice of their effects. The few following notes, however imperfect, may not therefore be uninteresting; more particularly as they are the result of direct experiments upon myself and others with the agents in question. In most of these experiments, I had the kind and able assistance of Dr. Keith and Dr. Duncan.

When first publishing, in November last, upon the anæsthetic properties of chloroform, I stated that, "in making a variety of experiments upon the inhalation of different volatile chemical liquids, I have, in addition to perchloride of formyle, breathed chloride of hydrocarbon, acetone, nitrate of oxide of ethyle, benzin, the vapour of iodoform, &c. I may probably (I added) take another opportunity of describing the result."—(See *Lancet* for 20th November 1847, p. 549.)

Three of the substances which I named in the preceding list, produce, when inhaled, a state of anæsthetic insensibility; viz., chloride of hydrocarbon, nitrate of oxide of ethyle, and benzin.

CHLORIDE OF HYDROCARBON.

Chloride of Hydrocarbon, or *Dutch liquid*, as it is often termed, in consequence of being first discovered by the Dutch chemists of the last century, is one of the various fluids to which the name of *chloric ether* was for some time given.

When equal parts of olefiant gas and chlorine are mixed together, the two gases rapidly disappear, and produce a colourless oily liquid, of a peculiar sweetish taste and ethereal odour. Its specific gravity is 1.247. It boils at 148°. It is composed of four atoms of carbon, four of hydrogen, and two of chlorine. Hence its formula is $C_4\ H_4\ Cl_2$.

When its vapour is inhaled, the chloride of hydrocarbon causes so great irritation of the throat, that few can persevere in breathing it for such a length of time as to induce anæsthesia. I have latterly, however, seen it inhaled perseveringly until this state, with all its usual phenomena followed; and without excitement of the pulse, or subsequent headache. When I myself attempted to inhale the chloride of hydrocarbon, it produced an extreme degree of acrid irritation in the throat, which did not disappear entirely for many hours afterwards.

NITRATE OF ETHYLE.

When two parts of alcohol, and one part of pure nitric acid, are distilled together, with the addition of a small quantity of urea, *nitrate of ethyle*, or more properly, *nitrate of oxide of ethyle*, is produced. It is a transparent colourless liquid, with a sweet taste, and very agreeable odour. Its specific gravity is 1.112; it boils at 185°. It is a compound of four proportions of carbon, five of hydrogen, six of oxygen, and one of nitrogen; and its formula is $(C_4\ H_5)\ O,\ NO_5$, or $Ac\ O,\ NO_5$.

Nitrate of ethyle is easy and pleasant to inhale, and possesses very rapid and powerful anæsthetic properties. A small quantity, such as fifty or sixty drops, when sprinkled on a handkerchief and inhaled, produces insensibility after a few inspirations. But during the brief period which elapses before the state of complete anæsthesis is induced, the sensations

of noise and fulness in the head are in general excessive; and much headache and giddiness have usually followed its employment, and persisted for some time.

BENZIN.

Benzin or *benzole* was first discovered by Faraday, as one of the products in his experiments on compressing oil gas, and was designated by him *bicarburet of hydrogen.* Mitscherlich afterwards obtained it by distilling, at a high temperature, benzoic acid with an excess of slaked lime.

It is a clear colourless liquid, of a peculiar ethereal odour, with a specific gravity of 0.85, and boils at 186°. It is believed to be composed of two proportions of carbon and one of hydrogen. Its formula is C_2 H; or perhaps, more properly, C_{12} H_6. It is polymeric with the hypothetic radical formyle.

In my experiments with benzin, I found it capable of producing anæsthesia; but the ringing and noises in the head accompanying and following its inhalation were so excessive, and almost intolerable in the case of myself and others, as to seem to us to render its practical applications impossible, even had there been no other objections to its use. Latterly, Dr. Snow has tried its employment upon some patients for tooth drawing, and in one instance of amputation. In this last case it produced convulsive tremors.—(*Lancet* for 12th February 1848, p. 180.)

ALDEHYDE.

Aldehyde or *hydrate of oxide of acetyle*, was first noticed by Dœbereiner in distilling together sulphuric acid, alcohol, and peroxide of manganese, but it was left for Liebig to fix and determine every thing about its chemical nature. It is a colourless limpid liquid, of specific gravity 0.791. It is very volatile, boiling at 72°. It spontaneously changes when long kept, and is converted into two substances, a solid and a fluid, metaldehyde and elaldehyde. Liebig found it to be composed of four atoms of carbon, four atoms of hydrogen, and two of oxygen, and its formula is C_4 H_3 O + aq.

Professor Poggiale of Paris has lately made some experiments with dogs on the inhalation of the vapour of aldehyde, and from these has concluded that its anæsthetic effects will be found more prompt and energetic than those of sulphuric ether or chloroform. It certainly possesses, like some of the preceding agents, well-marked anæsthetic properties, but it assuredly will never come into use, as very few will be found capable of inhaling a sufficient dose of its vapour. In fact, out of five of us that attempted to inhale aldehyde, very carefully prepared and purified, four were driven to suspend the respiration of it in consequence of the coughing and insufferable feelings of dyspnœa which it immediately induced. The sensations of difficult respiration and constriction in the chest which the vapour produced, resembled precisely those of a severe fit of spasmodic asthma. In the fifth case, the experimentalist, after perseveringly breathing the aldehyde for a minute or two, became entirely insensible; the state of anæsthesia lasted for two or three minutes, during which the pulse became excessively small and feeble. On recovering, the bronchial constriction and coughing, which had disappeared as the anæsthesia was induced, returned immediately, and was annoying for some time.

BISULPHURET OF CARBON.

Bisulphuret of carbon, or *alcohol of sulphur* (as it was at first termed) was accidentally discovered in 1796, by Lampadius, when experimenting on iron pyrites. Different opinions of its composition were held by different chemists, but Berzelius and Marcet in 1813, at last fully confirmed the previous idea of Clement and Desormes, Vauquelin, &c., that it consisted

only of sulphur and carbon. It is composed of two atoms of the former to one of the latter, consequently its formula is C S_2.

The most easy method of procuring it is by transmitting the vapour of sulphur over fragments of charcoal heated to redness in a closed porcelain or iron tube. The resulting bisulphuret of carbon, when purified by distillation, is a clear, colourless liquid, of a pungent taste. Its specific gravity is 1.272. It is very volatile, boiling at 108°.

It has been stated in various literary journals, that bisulphuret of carbon has lately been used as an anæsthetic agent at Christiana; but no particulars regarding its employment in Norway have, as far as I know, been yet published.

I have breathed the vapour of bisulphuret of carbon, and exhibited it to about twenty other individuals, and it is certainly a very rapid and powerful anæsthetic. One or two stated that they found it even more pleasant than chloroform; but in several it produced depressing and disagreeable visions, and was followed for some hours by headache and giddiness, even when given only in small doses. In one instance I exhibited it, with Mr. Miller's permission, to a patient, from whom he removed a tumour of the mamma. It very speedily produced a full anæsthetic effect; but it was difficult to regulate it during the operation. The patient was restless in the latter part of it; but felt nothing. Like several others when under it, her eyes remained wide open. After the operation she was extremely sick, with much and long-continued headache; and, for fifty or sixty hours subsequently, her pulse was high and rapid, without rigour or symptoms of fever.

I tried its effects in a case of midwifery, in presence of Dr. Weir, Dr. Duncan, Mr. Norris, and a number of the pupils of the Maternity Hospital. It was employed at intervals during three quarters of an hour. The patient was easily brought under its influence, a few inspirations sufficing for that purpose; but it was found altogether impossible to produce by it the kind of continuous sleep attending the use of chloroform. Its action was so strong, that when given, as a pain threatened or commenced, it immediately affected the power of the uterine contractions, so as often to suspend them; and yet its effects were so transient that the state of anæsthesia had generally passed off within a minute or two afterwards. The patient anxiously asked for it at the commencement of each pain. During its use she was occasionally sick, and vomited several times. Latterly her respiration became rapid, and her pulse rose extremely high. I then changed the inhalation for chloroform, and, under it, the patient slept quietly on for twenty minutes, when the child was born. During these twenty minutes there was no more sickness or vomiting, and the pulse gradually sunk down to its natural standard; and a few minutes after the child was expelled, and while the mother still slept, her pulse was counted at 80. Next day the mother and infant were both well, and she has made a good recovery.

While these experiments prove the strong anæsthetic properties of bisulphuret of carbon, they at the same time show its disadvantages. I have not alluded to another strong drawback upon its use, viz., its very unpleasant odour. "It has (says Dr. Gregory) a peculiarly offensive smell of putrid cabbage."—(*Outlines of Chemistry*, p. 130.) By dissolving various essential oils in the bisulphuret I tried to overcome this disagreeable defect, but without much success.

None of the five anæsthetics which I have mentioned in the present communication, are, I believe, comparable with chloroform or sulphuric ether, either in their manageableness or in their effects. And the after consequences which all of them tend to leave, are too severe and too frequent to admit of their introduction into practice. They are more interesting physiologically than therapeutically.—*Monthly Journal.*

ON THE USE OF MANDRAKE AS AN ANÆSTHETIC IN FORMER TIMES.

(Extracted from a Paper read before the South London Medical Society).

BY T. H. SILVESTER, M.D.

After some remarks on the accuracy of discrimination of the ancients, in their use of the poppy, *Cicuta*, *Hyoscyamus*, and other anodynes, regarding some as soporifics, or merely provocative of sleep, others as anodynes, or affording relief to bodily pain, and one in particular as an anæsthetic, possessing virtues analogous to ether and chloroform, and probably employed in a similar manner, and for a like purpose,—the author proceeded to give a particular and detailed account of a plant now fallen into utter disuse, but evidently endowed with properties of a singular and powerful kind—namely, the *Mandrake*. This remarkable drug, it was said, belonged to the order *Solanæ*, and was mentioned by almost every medical author from the time of Hippocrates downwards to the end of the last century; it is found wild in many parts of Europe and Asia, and is everywhere invested with extraordinary and often fanciful properties. "It is reported," says Cruden "that in the province of Pekin, in China, there is a kind of mandrake so valuable, that a pound of that root is worth its weight in silver; for they say it so wonderfully restores the sinking spirits of dying persons, that they often thereby return to life and health." This corresponds in some degree with a remark of Hippocrates,* that a small dose of the mandrake-root in wine—less than sufficient to induce delirium—effectually cures those who are saddened in spirit and ready to destroy themselves, as also those who are sinking and anxious.

Josephus,† describes it under the name of *Baaras*, as efficacious in the cure of sick persons dying from the malignant influence of demons: and Pliny says, that those who take it improperly, are made dumb for a time; and if the dose be too large, they surely die; yet it may be safely enough given to procure sleep. It seems that Dr. Lee, in his *Hebrew Lexicon*, regards the *dūdhāīm* mentioned in the Scriptures, as the same thing with the Syriac *yabrūhhē* the Chaldee *yabrūhīn*, and Arabic *yabrūhn*, and says that they were the mandrakes or plants ranged by Linnæus under the designation *Atropa mandragora*, and, according to the *Ihliyarat Badē*, a Persian work, and other authorities cited by Castell, and to be found in Lee's *Hebrew Lexicon*, when taken inwardly, they render one insensible to the pain of even the cutting off a limb.

The father of medicine, it was said, gave explicit directions for its employment, and seemed, from the following quotation, to have used it in tetanus:

"Thus it behoveth to cure convulsion:—Let a fire be lighted on each side of the couch, and let the root of the mandrake be given in drink, in a less dose than is sufficient to bring on delirium."

Many other allusions to this potent drug would be found in the works usually ascribed to Hippocrates, and as the dried root was often prescribed, it appeared to the author not improbable that the fire on each side of the couch was for the purpose of producing fumes which the patient might inhale; this practice not being uncommon among the ancients, according to Camerarius. Whereof, says this interesting author, we have an example in the ancient Thracians, who in their feasts used to walk about the hearth, and to cast into the fire certain seeds of herbs, the smoke of which would make them fall asleep, after a short fury or madness; and this custom, according to Homer, was common among the Massagetæ.

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* *Hippocrates de Locis in Hominibus*, p. 76.

† Book vii, ch. 6, p. 3.

All the ancient medical writers it appears were acquainted with the peculiar virtues of the mandrake. Aretæus in numerous places alludes to it, prescribing it generally in combination with other drugs.

Actius says, that those who drank an infusion of the root fell into a deep and long-continued sleep or stupor, and took scarcely any notice on any attempt being made to arouse them, and soon relapsed into the same sleepy state; whilst others, at first disturbed in mind, slowly fell into an oblivious condition; some seemed to have only the natural sleep augmented; danger was present when the patient kept constantly drawing in the air through his mouth, gasping for breath, and if help were not soon afforded, he died convulsed.

Paulus Æginitus ‡ also appears to have been well acquainted with the mandrake. If it be drunk (he says) a heavy sleep, stupor, and relaxation of the frame immediately take place, and so vehement is the tendency to torpor, that the condition differs nothing from lethargy or apoplexy itself; walking the patient about, and applying stimulants to the nostrils, are the suitable antidotes.

In order to prove that the remedy in question was exhibited, not exclusively as a narcotic or soporific, but anæsthetically,—that is to say, for the purpose of preventing the suffering arising from operations, by destroying or lessening the sensibility of the body,—numerous other ancient authorities were adduced.

Dioscorides §, after describing two kinds of mandrake, the white and black, or male and female, and the effects of the berries eaten accidentally by shepherds, namely a sleepiness and torpor, gives directions for the preparation of the root, which is to be boiled down in wine to a third, and the strained decoction kept for use. A cupful of this is to be taken for severe pains of any part of the body, and also *ante sectiones, ustionesque, ne sentiantur*, or "before amputations, and the use of the actual cautery, to prevent the pain which these operations occasion." The expression occurring in the same author—*ciet atque partus*, "it promoteth parturition," was noticed as indicating its employment in midwifery, but other passages were brought forward containing a still more explicit account of the administration of this now disused plant, such as the following from Dioscorides, in reference to a wine prepared from the external coat of the root:—

"The person falls into a profound sleep in the same attitude as when he drank the potion, and remains deprived of sense three or four hours. Physicians also employ this remedy when a necessity arises of amputation, or of applying the actual cautery."

Similar testimony is afforded to the powers and peculiar properties of the mandrake, by the second Pliny in his *Natural History*‖.

It is difficult, the doctor observed, to trace the fortunes of the plant in question through the dark ages: no express mention is made of it in Albertus Magnus, although from certain passages occurring in his treatises, *De Mirabilibus Mundi* and *De Virtutibus Herbarum*, it is evident that a power of an analogous kind was recognized at that period. It appears also that in the celebrated volume of Joannes Baptista Porta¶ *On Natural Magic*, quotations from the works of the ancients on the subject in question abound, and likewise very particular directions for the preparation of various potions, poma, and essences, possessing hypnotic (as they are termed) qualities; nor

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‡ *Paulus Æginitus*, p. 547, ch. 44.

§ Is it not more than probable, that the mandrake, mentioned in Scripture, as brought from the field by Reuben to his mother Leah, was sought for by Rachael for the purpose of alleviating the pains of parturition, which she was expecting shortly to undergo? *Genesis*, ch. xxx, v. 14.

‖ Lib. xxxv., cap. 94.

¶ Lib. iii., vol. 103.

are there wanting accurate descriptions of the fearful effects of large doses of hyoscyamus, solanum, poppy, and belladonna. The mandrake, observes this alchymical philosopher, induces sleep and stupor; and, according to Dioscorides, those men who had drunk of it fell into a torpor, and remained deprived of sense three or four days, during which time the doctors who had administered it resorted to amputation and cauterization. He adds, that Demosthenes likened some of his hearers to those who had drunk the mandrake, whom it was impossible to arouse. But the most remarkable portion of Porta's treasury of early science is that relating to *Medicamenta somnifera*, in which will be found detailed the ingredients, mode of preparation, and exhibition, of an essence or hypnotic tincture, as follows:—The aforesaid drugs, or as many of them as possible, being converted into an essence, "this is shut up in leaden vessels, most accurately closed, lest the subtle *aura* should escape, for in that case the medicine would vanish away. At the moment of using, the lid being opened, the vessel must be brought immediately under the nostrils of the sleeping person, and he will draw in by breathing the most subtle strength of the vapour, and thereby his senses will be locked up, as it were, in a citadel, so that he will be buried in a most profound sleep, from which it will be impossible to awaken him, except by the greatest degree of violence. After this sleep no heaviness of the head is felt or remains, nor is the person aware of what has been done to him."

There is much reason to believe that alcohol and ether were in the hands of the initiated at that period, and employed with more or less practical skill in the extraction or solution of the active qualities of plants and herbs. As an illustration of this opinion might be adduced the formula for the preparation of an *aqua ardens*, from Albertus Magnus *De Mirab. Mundi*, p. 216: its chief ingredients are strong, old, dark-coloured wine, quick-lime, and common salt; it is to be distilled into an alembic, and kept in a glass vessel.

The following anecdote, translated from A. G. Meissner's *Skizzen*, or *Sketches*, a German work, published at Carlsruhe, A.D. 1782, would naturally lead to the supposition that anæsthetics were commonly had recourse to in severe operations even so late as the end of the seventeenth century.

Augustus, King of Poland and Elector of Saxony, suffered from a wound in his foot, which threatened to mortify. The court medical men were opposed to the operation of amputation, but during sleep, induced by a certain potion surreptitiously administered, his favourite surgeon Weiss, a pupil of Petit, of Paris, cut off the decaying parts. The royal patient was disturbed by the proceeding, and inquired what was being done, but on receiving a soothing answer he again fell asleep, and did not discover till the following morning, after his usual examination, that the operation of amputation had really been performed. The above is a meagre abstract of the original tale, which is worked up by Meissner into dramatic effect.

It would be natural to expect that a matter of so much importance to mankind should not escape the play-writer, whose object it is to display all that deeply interests or affects humanity; and, accordingly, in Middleton's tragedy of *Women beware Women*, published in 1657, there occurs the following passage, from which it may be inferred that the practice of adopting means for the prevention of pain in operations was general and well known:—

> 'I'll imitate the pities of old surgeons
> To this lost limb, who ere they show their art,
> Cast one asleep, then cut the diseased part."

The author concluded by expressing a hope that he had convinced his hearers of the truth of the following propositions:—

1st. That from the earliest ages, drugs, and more especially the *Atropa mandragora*, had been administered to persons about to suffer great pain from operations or other causes.

2dly. That by these means a dreaming state, deep sleep, and perfect insensibility were produced,—conditions not differing from those which in modern times are induced by ether or chloroform.

3dly and lastly. That essences of a soporiferous nature were exhibited by inhalation in a manner precisely identical with that now in use.—*London Medical Gazette.*

ON LUCIFER MATCHES;

THEIR PREPARATION, AND DISEASES OF THE WORKMEN EMPLOYED IN THEIR MANUFACTURE.

WITHIN the last three or four years, the attention of the medical profession has been directed to a remarkable disease observed in some of the workmen employed in lucifer-match manufactories. The disease alluded to, is *necrosis* (or death) of the jaw-bone. Several notices of this malady have appeared in the British and Foreign medical journals, and the subject is incidentally alluded to in Mr. Alfred Taylor's very valuable work *On Poisons*. But the only separate publication on the subject, is that of Messrs. von Bibra and Geist* printed last year in Germany, the chemico-physiological part of which is by Dr. von Bibra, the medico-chirurgical and forensic part by Dr. Geist.

In the last number (for April, 1848) of the *British and Foreign Medico-Chirurgical Review*, is a very interesting review of the above work, containing some additional details relating to the manufacture, &c., of lucifer matches, by the reviewer. From this review we abstract the following details :—

1. MANUFACTURE OF LUCIFER MATCHES.

The manufacture of the common sulphur match, which is now exploded, might occasionally have produced bronchial affections by the disengagement of sulphurous-acid fumes ; but the quantity consumed was so small, compared to the present consumption of lucifer matches, and the manufacture itself is so much simpler than that of the latter, that for both reasons the number of workpeople employed in the two instances differed very much. The processes necessary for the preparation of lucifers, include those for the manufacture of sulphur matches, as the first stages ; and the account we shall give applies as well to the method adopted in Germany as to that pursued in England, which we have been at considerable pains to investigate, in order, if possible, to satisfy our readers as to the reality both of the causes and of the effects. It appears that the invention was originally made in Germany, and thence imported into England. Dr. Geist states that his countrymen commenced the manufacture between sixteen and twenty years ago ; whereas the proprietor of an extensive manufactory in the city, who assumed for himself the priority of the invention, or of its introduction into England, stated that he had only been engaged in the business for about ten years. However, we have received conflicting accounts with regard to this point, and would not, therefore, insist upon the absolute correctness of the information.

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* *Die Krankheiten der Arbeiter in den Phosphorzündholzfabriken, ins besondere das Leiden der Kieferknochen durch Phosphordämfe. Vom chemisch-physiologischen, medicinischchirurgischen und medicinischpolizeilichen Standpunkte.* Bearbeitet von Dr. Fr. Ernst von Bibra und Dr. Lorenz Geist. Mit neun gemalten Kupfertafeln.—Erlangen, 1847.

The first stage in the manufacture of lucifers is the cutting the wood, which is done, according to the extent of the manufactory, either by hand or by machinery. This, as well as the subsequent process of counting and placing the matches in frames, is in itself necessarily free from any inconvenience or evil consequences ; nor does it appear that the third stage, which consists in melting the sulphur and dipping the heads of the matches in it, produces any inconvenience. The fourth, fifth, sixth, and seventh stages comprise the grinding, mullering, and mixing of the explosive compound, the process of dipping the matches in it, the counting and boxing. The dipping, counting, and packing, appear to be, according to Dr. Geist, the only departments in which the workpeople are in any way affected with peculiar complaints ; we would even limit the appearance of the jaw-disease to those engaged in dipping, at least all that we have examined on the subject were unanimous as to the fact that dippers only were attacked. There is a certain degree of secrecy observed relative to the proportions of the composition ; and the mixture of the materials is generally performed by the proprietor of the manufactory, or by a confidential workman. Chlorate of potash is considered an essential ingredient in England, but in the manufactories at Nürnberg it has not been employed for a number of years, as its explosive properties much endangered the safety of the buildings and the limbs of the workmen.

" The composition used in Nürnberg consists of one-third of phosphorus, of gum arabic (which is eschewed by English manufacturers on account of its hygrometric property) of water, and of colouring matter, for which, either minium or Prussian blue is employed. If ignition be required without a flame, the quantity of phosphorus is diminished, or nitrate of lead is added. The mixing is conducted in a water-bath, and during this process, and as long as the phosphorus is being ground or ' mullered,' copious fumes are evolved. The dipping is performed in the following manner : The melted composition is spread upon a board, covered with cloth or leather, and the workman dips the two ends of the matches alternately that are fixed in the frame ; and as this is done with great rapidity, the disengagement of fumes is very considerable, and the more liable to be injurious, as they are evolved in a very concentrated form close to the face of the workman. This department is generally left to a single workman, and the average number that he can dip in an hour, supposing each frame to hold 3000 matches, would be one million." (p. 233.)

After the matches have been dipped, they require to be dried. This is generally done in the room in which the former process is carried on, and as a temperature of from 80° to 90° Fahr. is necessary, the greatest quantity of fumes is evolved at this stage. When the matches are dried, the frames are removed from the drying-room, and the lucifers are now ready to be counted out into boxes. As this is done with great rapidity, they frequently take fire, and, although instantly extinguished in the sawdust or the water which is at hand, the occurrence gives rise to an additional and frequent evolution of fumes.

2. DISEASES OF THE WORKMEN EMPLOYED IN LUCIFER MANUFACTORIES.

The French writers† dwell upon bronchitic affections, as a frequent and serious consequence of the influence of the phosphorus fumes ; and although Dr. Geist gives one case of severe bronchitis, which he was unable to refer to anything else than to the direct influence of the vapour, he distinctly states it as his experience that bronchitic affections are the

† Gendrin, in Roussel's *Mémoire* présenté à l'Académie des Sciences, le 16 Févr. 1846 ; Strohl, *Gazette Méd. de Strasbourg*, Nov. 1845.

exception, and that the people engaged in this occupation are not more liable to general indisposition than the workpeople in other manufactories. Our own inquiries, so far as they go, fully corroborate Dr. Geist's statement; in fact, we are able to advance a step further, for several of our informants have assured us that their general health has improved since they had been engaged in this occupation. We shall have occasion hereafter to revert to the London cases more particularly; but we may here mention a fact which is assumed by the workpeople themselves as a matter of confirmed experience, that when the local affection occurs, it acts as a counter-irritant, and thus serves to improve the constitutional condition, if this had been previously debilitated by other causes.

The local affection here referred to is necrosis of the jaw-bone. The details of this malady, are, however, too purely surgical to be entered into here. Suffice it therefore to state, that the malady is marked by toothache, carious teeth, pain in the jaw-bone, inflammation and suppuration of the gums, and death of the bone. The disease may terminate with the exfoliation of the bone.

But if the strength of the patient does not suffice to carry him through, the soft parts become still further involved, and as in the case we quoted at full, the ravages extend, until death terminates the scene.

The following is a tabular statement of the seat of the malady in fifty-two cases:—

Upper jaw	21
Lower jaw	25
Both jaws	5
Uncertain	1
Total	52

Dr. Letheby states that he detected excess of the phosphates in the urine of persons occupied in the manufacture of lucifer matches.

3. CAUSES OF THE DISEASE OF THE JAW-BONE.

Various conjectures have been made with respect to the cause of this disease.

We find it attributed by some, and not without apparent reason, to rheumatic influences, to arsenic contained in the phosphorus, to phosphoric acid, to the fumes of phosphorus, and to the lower degrees of oxidation of phosphorus.

Dr. Geist first deals with the question as to rheumatic influences. When the disease first made its appearance in Nürnberg, this view prevailed, owing to the extreme heat of the rooms in which the people worked, and their frequent exposure to sudden currents of cold air. In consequence of this opinion, precautions were taken to prevent the constant occupation of the workpeople in the hottest room; and while they were engaged in it, it was strictly forbidden to give rise to draughts by opening the windows. The disease, nevertheless, occurred as frequently as it had previously done. In the meantime, Professor Martius, of Erlangen, had discovered that the phosphorus employed in the manufactory in which the largest number of cases presented themselves, contained arsenic; and the conjecture arose that it was the arsenic and not the phosphorus, which produced those dire results. This view is advocated by Dupasquier, of Lyons, who has observed none of the effects attributed to phosphorus, either in a phosphorus or in a lucifer manufactory; but has found that while sulphuric acid containing a proportion of arsenic was employed in the manufacture of phosphorus,

the workmen were liable to painful contractions of the fauces, and to fits of vomiting and indigestion. As soon as pure sulphuric acid was used, these symptoms vanished.

"However, the local origin of the jaw disease," remarks Dr. Geist, in reference to this question, "which view of its nature soon came to prevail; —the specific relation of the phosphorus-fumes to the capillaries of the periosteum, which satisfactorily accounts for the development of the disease, and which, as we shall have occasion to see, was proved by direct experiments on animals;—the observations made by Fuchs on the influence of arsenic among the arsenic-smelters in the Harz, among whom nothing at all resembling the phosphorus jaw disease has ever been experienced, either as the result of a general poisoning by arsenic, or as the immediate effect of an endosmotic process in bones exposed to the vapour of arsenic; —the very minute quantity of arseniuretted hydrogen contained in the fumes;—and, finally, the circumstance that the disease has continued to occur, although for many years phosphorus has been employed which is not contaminated with arsenic;—all these reasons are too powerful objections for us still to continue to attribute to arsenic the causation of the disease." (p. 214.)

How far the chlorate of potash, which is extensively used in France and England, influences the health of the workpeople, Dr. Geist leaves undecided, though he admits the probability of its being the cause of complication of bronchitic and gastric symptoms.

The direct proof of the fact that the fumes of phosphorus are the cause of the malady, is offered by Dr. von Bibra; who has instituted a series of experiments on living animals, by exposing them to the influence of more or less concentrated vapour of phosphorus. The conclusion he arrives at is, that "when the fumes were very dense, they produced inflammation of the tissue of the lungs, and when less concentrated, bronchitis; that they enter the stomach and cause gastric disturbance; that they give rise to a decomposition of the blood; and finally, that, by direct contact with the periosteum, they cause it to inflame and to deposit new osseous matter." It is assumed that lower degrees of oxidation than that found in phosphoric acid are the agents in producing the affection of the jaw; as nothing of the kind is found in phosphorus manufactories, in which the atmosphere is impregnated with phosphoric acid. Dr. von Bibra thinks that the phosphorus volatilizes, and that the resulting combination with the oxygen of the atmosphere is hypophosphorous acid, to which the deleterious effects must be attributed. We cannot enter into the vague question as to whether Schönbein's ozone has or has not anything to do with the matter; although Bibra lays some stress on the observation, that there is a formation of ozone during the volatilization of phosphorus in the atmosphere.

It will now be intelligible why the workpeople employed in certain departments of the manufacture of lucifers are more liable to be attacked than others. The dippers are necessarily more exposed to the fumes of phosphorus, which, as the fused composition is poured on the slab before them, are evolved in great quantities immediately under their nostrils. The more rapidly the work is done, the greater will be the risk. The process of counting and packing also causes a considerable evolution of phosphorus fumes; and we find accordingly that in Nürnberg the counters and packers are affected like the dippers.

4. PREVENTION OF THE DISEASE.

Dr. Geist discusses the prevention of the disease in the forensic portion of the work, and makes the following suggestions:—

"1. In those manufactories which produce such a large quantity of

lucifers that the process of drying is constantly going on, and therefore giving rise to a constant evolution of fumes, the drying-room should be entirely detached from the other workrooms.

"2. In those manufactories in which the drying is effected during the night, or during the absence of the workpeople, the drying-room may communicate with the other workrooms, and it will be merely necessary to air the former well after the drying process is completed, to provide the room with a ventilating shaft, and not to employ it as a workroom. In both cases the drying should not be carried on at a higher temperature than 65° Fahr.

"3. The composition should not be made, and the dipping not conducted, in the presence of the other workpeople, but in a detached room.

"4. The counting and packing-room should be well ventilated, and not be too much crowded with workpeople.

"5. The same to be the rule with regard to the room in which the matches are arranged in frames.

"6. All the rooms must be ventilated three times a day, for an hour at a time, by opening the windows and doors, viz., before the work begins, during dinner-time, and after the work is over.

"7. The workpeople to be prohibited keeping their victuals and consuming them in the workshops, because the fumes combine with them, and, by being introduced into the stomach, give rise to gastric disturbance.

"8. The purification by ignition of the frames, crucibles, and other utensils, to which phosphorus and sulphur remain attached, should be prohibited." (p. 322).

The attention which the continental governments, and more especially those of Germany, have long paid, and continue to pay to sanitary questions is well known ; but the English manufacturer dislikes this kind of paternal supervision ; and the difficulty of insisting upon measures of precaution, which generally involve a primary outlay of capital, is notorious. We have found in the course of our inquiries a frequent neglect of all precautionary measures ; but in the case of small manufacturers, it does not appear that a corresponding amount of injury ensues. A considerable amount of phosphoric fumes is requisite ; and a continued and uninterrupted occupation in the impregnated atmosphere appears to be a necessary condition to the production of the jaw disease. We are happy to say, that what even the government measures have not yet effected in Germany, we have found carried out in a large manufactory in the city, in consequence of the wise and benevolent views of the proprietors. We would advert to this case the more, as both from our personal examination, and from the testimony of a distinguished physician who has long been acquainted with the parties, we are able to vouch for an absence of all collusion. We would advert to it also as a proof, that, even among the lower orders, a knowledge of the value of sanitary arrangements, and a due appreciation of their bearings, is gradually making its way, and enforcing conviction, in a manner which affords the most gratifying proof that the labours of our profession and of others have not been thrown away. The proprietors of the lucifer manufactory in Princes Square, Finsbury, employ fifteen girls and fifty boys, some of whom have been engaged there for eight years, and eleven men, some of whom have worked there for ten years, and no case of the disease has occurred among them. We saw one girl who had been exclusively engaged in dipping matches for seven years without being ill, and who still looked perfectly healthy and robust ; others were pointed out who had equally preserved perfect health, although engaged in the manufacture of the matches for many years. The precautions used, are, that the workpeople are required to wash their hands night and morning in soda, which our informant assured us, was the only

means which completely removed all the phosphorus; they receive tea or cocoa night and morning, eat their meals at the manufactory, and work from morning to night without going home. The dippers, with the exception of the girl above mentioned, wear sponges before their mouths. Still even these precautions would scarcely have prevented the influence of the fumes, unless proper means had been taken to prevent their accumulation; and this was done so effectually, that although our visit was quite unexpected, and occurred while the workpeople were all fully engaged, we scarcely perceived any unpleasant smell. The ventilation had been effected at a considerable outlay, by the introduction of large and numerous ventilating shafts, so that it is constant and effective. It is evident that a temporary opening of the windows must be inefficient to remove fumes which are being permanently and copiously evolved; it is only by providing a regular circulation of pure air that they can be carried off, or sufficiently diluted. In the hope that the statement may be of service to others who labour in the cause of sanitary reforms, we shall conclude our analysis of Dr. von Bibra's and Dr. Geist's treatise, by giving the measurements of the ventilating shafts in the above-named manufactory. The names of the different rooms at once indicate the separation of the different stages of the manufacture from one another, and the objects to which they are specially devoted.

"*Sulphuring-room*—open, shaft	6 ft.	by 4 ft.
Cutting-room—open—two fanlights to open	5	$3\frac{1}{2}$
	3	2
Packing-room—open—two fanlights	4	$3\frac{1}{2}$
	$3\frac{1}{2}$	3
Filling (clamp) room—open—two fanlights, each	4	2

The above, although in separate uses, are all open and on the ground-floor, and extend the whole length of the building.

Mixing-room—shaft	3 ft.	by 3 ft.
Fanlight to open	$4\frac{1}{2}$	$3\frac{1}{2}$
Filling-room, up stairs—two shafts	5	4
	4	$3\frac{1}{2}$
Three fanlights to open	5	$4\frac{1}{2}$
	4	$3\frac{1}{2}$
	$3\frac{1}{2}$	$3\frac{1}{2}$

Five windows, all of which open about 4 ft. each way.

Drying-room—four windows, all of which open, and no one employed in that room, except two, who take in to dry, and fetch out when dry.

These rooms extend the whole length of the building."

ON A NEW CINCHONA ALKALOID (*QUINIDIN*).

BY F. L. WINCKLER.

Several years ago, I observed that a sulphate of quinine is sometimes found in commerce, which, upon the most minute chemical examination, appears to be pure, and is particularly free from cinchonine, but yields, on being decomposed by ammoniæ, or subcarbonate of soda, a hydrate, the alcoholic solution of which, deposits, when slowly evaporated, a greater or less quantity of crystals, the form of which differs essentially from that of the hydrate of quinine obtained by mixing an alcoholic solution with much water. I even fancied that some pure hydrate of quinine was sold me, which almost entirely consisted of the crystallizable alkaloid just mentioned. I have since then tried to find which kind of bark sold as yellow bark (*China regia*) might contain this crystallizable alkaloid in the greatest

quantity, and found it in one, along with a preponderating amount of quinine.

This bark is imported, packed in the same way as the genuine yellow bark (*China regia*) the so-called monopolized article, and is very likely from the same species of the genus Cinchona, or of one nearly related to it, from which the genuine yellow bark is obtained. The contents of the bale examined by me, reminded me of Huamalies bark. The greater part consisted of more or less large, but not very large, flat and half-curved fragments of very varying thickness, and of various not considerable width. But there were also in it some rather long, half, or entirely quilled pieces, of different dimensions. Both the fragments and the quills possessed, with regard to colour, the quality of the upper and under surfaces, and the fracture the greatest similarity with Huamalies bark. Warty protuberances, which so distinctly characterise the Huamalies bark, were not so numerous. In most fragments, the epidermis was wanting; in the quills it was well preserved, and of a whitish colour. The exterior surface of many quills, chiefly of the larger ones, was covered with nearly regular transverse cracks, so that this bark might have been mistaken, even by experienced persons, for Huanuco (grey) bark.

The crude alkaloid obtained from this bark, is a rather loose, yellowish-white powder, of a very bitter taste. It dissolves readily in spirit of wine of 80 per cent., and yields a dark brownish-yellow liquid, leaving behind a very inconsiderable calcareous precipitate. As the new alkaloid dissolved in a much smaller quantity than quinine, I treated four ounces of it with rectified ether. This dissolved a pretty large quantity of it; the solution appeared yellow; after being treated with animal charcoal, it became intensely golden yellow, and left behind, on being evaporated, a resinous, yellow-coloured alkaloid, which was purified by being transformed into a sulphate. By decomposing this with carbonate of soda, a brilliant white hydrate of quinine was obtained, which, being air-dried, dissolved copiously in ether. In purifying this alkaloid, a considerable proportion of the yellow resinous compound was obtained, which makes it so difficult to obtain the alkaloids pure, especially when operating with but small quantities of bark.

That part of the crude alkaloid which remained undissolved in ether, was now dissolved in spirit of wine of 80 per cent. (at + 70° R.) and the solution for some time digested with pure animal charcoal, at a temperature of + 50° R. The filtered liquid was still strongly coloured brownish-yellow, and yielded, by slow evaporation, deep-coloured crystals. In order to avoid every possible loss of the alkaloid, the separation of the colouring combination was now effected by forming the pure sulphate, and which succeeded without any difficulty, by applying the same method as for purifying quinine. The thus obtained sulphate was dissolved in distilled hot water, and decomposed by subcarbonate of soda, the washed and dried precipitate was dissolved in spirit of wine; this solution again treated with animal charcoal, and the filtered liquid, which was almost clear like water, allowed to evaporate at a low temperature. When the solution was tolerably concentrated, the alkaloid crystallized very easily; nearly one ounce of the purest crystals was obtained. In forming this alkaloid in a pure state, a considerable quantity of the brown resinous combination, which is found in smaller or greater quantities in almost all barks, separated. It can be more easily separated from the alkaloids than the above-mentioned golden-yellow compound with quinine.

The deposited crystals were right four-sided prisms of about $1-1\frac{1}{2}'''$ long, and about $1'''$ thick, limpid, transparent, and strongly glistening, the ends of which are either perpendicularly truncated, or inclined with one or two faces. As the one-sided oblique faces are parallel, rhomboidal surfaces

are frequently observed on the crystal with the naked eye. If the crystallization is effected rapidly, the alkaloid appears as a scaly, crystalline powder, which, under the microscope, is seen to consist of colourless, transparent, rhombic tables. The crystals are rather hard, like finely crystallized cane-sugar, are easily triturated, and furnish a bright white powder, which, by continued friction, becomes scarcely electrical, by which it is distinguished from the powder of the hydrate of quinine.

Carefully heated in a platinum spoon over a spirit flame, the crystals at first preserve their brilliancy, and melt at a higher temperature into a clear fluid like water, which, on becoming cold, readily solidifies into a crystalline bright white mass, similar to cyanide of potassium which has been melted and become again cold. If this mass be heated still more, it soon assumes a brownish colour, emitting at the same time vapours strongly smelling of quinol, igniting if the heat be increased, and burning with a red, bright, very sooty flame, leaving behind a small, voluminous, easily combustible coal. If the crystals be heated in a long narrow tube by the sand-bath, it is sometimes possible to obtain a small proportion of the unaltered alkaloid as crystalline sublimate.

If the alkaloid be precipitated from the solution of the sulphate or muriate by means of subcarbonate of soda or liquid ammonia, it precipitates in the form of a brilliant white, more pulverulent than flaky precipitate, which, after a few hours conglomerates and becomes crystalline. After washing and drying, the precipitate appears ; if it have been collected immediately after its deposition, very light and voluminous, similar to carbonate of magnesia. If collected after some time, it is distinctly crystalline, exactly of the same crystalline form as the alkaloid, which crystallizes from the alcoholic solution during quick evaporation.

Concentrated sulphuric acid (of 1.840 sp. gr.) and pure nitric acid (of 1.230 sp. gr.) dissolve, at common temperatures, both the crystals and the precipitate, and yield a colourless liquid, from which, on dilution with water, and precipitation with carbonate of soda, the alkaloid again separates unaltered. If, however, the solutions be heated whilst an excess of acid is present, they become coloured, and the alkaloid is decomposed, the same as quinine and cinchonine.

In order to discover the proportion of solubility in water, a small quantity of the crystals was finely triturated, and for some time shaken with distilled water (at + 10° R.) and rubbed down. The filtered liquid appeared clear, like water, possessed a perceptibly bitter taste, and re-acted in the following manner :—

AT FIRST.	AFTER TWENTY-FOUR HOURS.
1. Tannin, a rather strong, blueish white turbidness.	1. A voluminous, but inconsiderable white flakey precipitate.
2. Nitrate of silver without effect.	2. As at first, but after some days a trace of reduced silver was perceived.
3. Bichloride of mercury without perceptible effect.	3. As at first.
4. Neutral chloride of gold, yellowish turbidness.	4. Very scanty, finely pulverulent, yellowish precipitate.
5. Neutral chloride of platinum, without perceptible reaction.	5. As at first, only on the addition of one drop of muriatic acid, the liquid became scarcely perceptibly turbid, and somewhat later a trace of a pulverulent precipitate was observed.

The alkaloid, therefore, is only very slightly soluble in water. Some

phenomena having been observed in these experiments which were not quite conformable to those observed in the watery solution of quinine, the experiments were repeated with the watery solution of the pure hydrate of quinine, and the results found to be exactly the same.

In cold spirit of wine of 80 per cent., the alkaloid dissolved slowly, but almost as copiously as the hydrate of quinine; in boiling alcohol, it dissolved almost in any quantity. The colourless solution was as bitter as that of quinine became milky; when mixed with water, and after a few days, the alkaloid was found in this mixture in form of a crystalline powder. From the concentrated alcoholic solution obtained at a higher temperature, the alkaloid generally crystallized very readily as the solution became cold; but here, as in the crystallization of cane-sugar from water, anomalies are always observed when the alkaloid is not perfectly pure, especially when it contains a trace of the brown resinous compound.

In rectified sulphuric ether, the crystals dissolve less copiously than the pure air-dried hydrate of quinine. 5.200 grammes of a saturated solution obtained from fine powder with ether (at + 10° R.) left, on being evaporated, 0.036 grammes of perfectly dry alkaloid. 100 parts would consequently yield 0.6923 parts.

In diluted acids the crystals of the alkaloid dissolve rather slowly, the acids, however, are as perfectly neutralized by it in proper quantity, as by quinine and cinchonine; and if the neutral solutions of the salts, especially that of the sulphates, be mixed with an excess of acid, these solutions have an opalescent blue appearance, like that of sulphate of quinine.

If we compare the above-described physical properties, the re-actions, the pyrochemical relations, and the solubility of the alkaloid with the properties of quinine, we observe, with exception of the solubility in ether, a striking resemblance between both alkaloids, but the identity of them was yet doubtful, for the peculiar crystallization of the one, and the simultaneous occurrence of both in one and the same bark, justified this doubt. I therefore continued the experiments, and tried, especially by the analysis of some of the salts, to obtain further information. But, first, I considered it necessary to examine whether any, and how much water is contained in the crystals and in the precipitate obtained by decomposing the salts. 0.200 grammes of crystals were, therefore, exposed for about twelve hours in a platinum crucible to a temperature of +75° to 80° R. The crystals remained unaltered, glittering, and suffered, even after being exposed for twenty-four hours to the just mentioned, and sometimes even a higher temperature, *not the least loss in weight.* When the temperature was further increased, so that the crystals fused, and the mass was kept at this temperature for some hours in a fused state, carefully avoiding at the same time a partial decomposition, 0.200 grammes suffered a loss in weight of 0.002 grammes. When, however, the platinum crucible was covered with a well-fitting watch-glass, it was found that the loss in weight did not arise from the escape of water, since no trace of steam could be discovered, but the convex part of the glass became covered with a perfectly dry whitish sublimate, which, under a magnifier, appeared distinctly crystalline, and consisted of unaltered alkaloid. The same thing occurred with the crystalline precipitate obtained by adding to the sulphate some subcarbonate of soda. On the other hand, air-dried hydrate of quinine lost under the same treatment, on an average of three experiments, the results of which agreed exactly with one another, 14.1853 per cent. (=3 atoms) of water.

The new alkaloid contains, therefore, no water as hydrate, and differs in this circumstance from quinine.

In order to discover the atomic weight of the alkaloid, I formed the well-known platinum double salt, by dissolving a portion of the purest crystals

in a small excess of diluted hydrochloric acid, and mixing this solution with the necessary quantity of a solution of chloride of platinum. The double salt in no way differed from that of the purest quinine, and was carefully washed and dried at a temperature of + 80° R., and subjected to the pyrochemical decomposition. Of 0.200 grammes of this salt, were obtained in three experiments,

I.	II.	III.	as maxim. 0.05266 = 26.330 per cent. of metallic platinum.
0.054	0.051	0.053	

According to Liebig, the quinine platinum double salt leaves after the combustion 26.6 per cent. platinum, which statement I found perfectly correct ; the atomic weight of the new alkaloid corresponds, therefore, perfectly with that of quinine. The sulphate employed for analysis, was prepared with the purest crystallized alkaloid. It was in its appearance, not distinguishable from the salt of quinine. Under the microscope, it presented, like the latter, a conglomerate of delicate, transparent, right, obtuse, four-sided small prisms, and possessed the same solubility in cold and hot water, in alcohol, and in ether, as sulphate of quinine. For the purpose of analysis, 0.500 grammes of the salt having been carefully dried at + 10° R. were exposed in a platinum crucible for several hours, to a temperature of + 80° R. The loss in weight amounted on an average of three experiments to 0.062.

In order to determine the sulphuric acid, 0.500 grammes of the salt were dissolved in boiling distilled water, and the hot solution mixed with 0.250 grammes of crystallized chloride of barium. As the mean of three experiments, were obtained 0.143 grammes of sulphate of baryta, dried at + 80° R., and 0.138 grammes of ignited sulphate (= 0.047006 of sulphuric acid).

The proportion of the alkaloid was determined by dissolving 0.500 grammes of the salt in water, decomposing it by a slight excess of basic carbonate of soda, and exhausting the finely-powdered mass after having dried it in the water-bath with hot alcohol. The mixed alcoholic extracts left as the mean of three experiments, 0.37 alkaloid when dried at + 80° R.

The composition of the crystallized salt, and of that dried at 80° R. (efflorescent) is accordingly :

Crystallized salt.		*Efflorescent salt.*	
74.00000	alkaloid	83.5223	alkaloid.
9.48012	sulphuric acid	10.7000	sulphuric acid
17.51988	water	5.7777	water
100.		100.	

These proportions agree strikingly with the analytical results of the corresponding salt of quinine, so that both salts may be considered as similarly composed. I tried, therefore, whether the analysis of the neutral (acid ?) sulphate confirmed this supposition.

In order to obtain this salt, an accurately-weighed quantity of diluted sulphuric acid was neutralized by the powdered alkaloid ; the hot solution separated by the filter from the portion not taken up ; the solution in conjunction with the washings mixed with as much in weight of sulphuric acid as had been first employed, and allowed to evaporate at a gentle heat. When the liquid had assumed the consistency of syrup, the separation of the crystals commenced ; the evaporating vessel was then removed to a cool place.

In twelve hours, the greatest portion of the salt was crystallized, the crystals were removed from the fluid, and perfectly dried on paper at + 80° R. In twenty-four hours, that part of the solution which had been poured off from the crystals, had become hard, perfectly dry, and crystal-

line. The dried crystalline salt formed a conglomerate of fine, slightly glittering, asbestos-like needles, and under the microscope it appeared as a conglomerate of jointed, transparent, right-obtuse, four-sided, vitreous prisms. To determine the proportion of water, 0.200 grammes of these crystals were exposed in the platinum crucible for several hours to a temperature of + 80° R. The loss in weight amounted to 0.035 grammes, although by the continuation of the heat for many hours, no further decrease in weight took place ; yet when the temperature was increased until fusion occurred, taking care that no partial decomposition could take place ; the loss was 0.038 grammes = 19 per cent. Of the 0.200 grammes of the salt, there remained, therefore, 0.162 of the dry salt.

If the composition of this quantity be calculated according to the result of the analysis of the basic salt, it will be as follows, reckoning 18.96024 sulphuric acid to 74 of alkaloid in the neutral (acid ?) salt :—

(18.96024 : 74 = 0.0331 : 0.1289).

0.1289	alkaloid
0.0331	sulphuric acid
0.2000	

This composition would require for 0.200 grammes of the crystallized salt, 0.0963 grammes = 0.0331 sulphuric acid ; in three experiments were obtained as a mean, 0.101 grammes of sulphate of baryta dried at 80° R., and 0.096 grammes of ignited sulphate.

The salt deprived of water in the way described, is consequently anhydrous, and the composition of the crystalline salt, is

64.45	per cent.	alkaloid	
16.55	"	"	sulphuric acid
19.00	"	"	water
100.00			

which nearly corresponds with the combination of

			Per cent.
2	atoms	alkaloid $_2$(2055.512)	4111.024.....63.608
2	"	sulphuric acid	1002.330.....15.508
12	"	water	1349.738.....20.884
			6463.092 100.

The corresponding neutral (acid ?) sulphate of quinine, contains, according to the analytical result upon two atoms of the alkaloid, two atoms of sulphuric acid, and sixteen atoms of water. The composition of the examined salt differs, therefore, by a smaller proportion of water (4 atoms).

This fact, as well as the observation that the alkaloid contains no water as hydrate, made me suppose that the difference between the new alkaloid and quinine consists only in the chemical relation which both combinations have to water ; I undertook, therefore, a comparative analysis of the phosphates of both alkaloids.

Both phosphates were prepared by dissolving a certain quantity of the purest basic sulphate in hot distilled water, and decomposing them by a slight excess of the purest phosphate of soda, which had been prepared for this purpose with chemically pure tribasic phosphoric acid, and was, therefore, free from any admixture of pyrophosphoric acid. On becoming cold, both salts separated in the form of a brilliant white crystalline mass, which was only slightly soluble in water.

Both salts having been first dried at + 10° R., appeared as loose crystalline masses, similar to the commercial sulphate of quinine. The quinine salt was certainly somewhat finer crystallized, but under the microscope the crystalline formation was perfectly alike; four-sided, right obtuse small prisms, as clear as water.

The proportion of water was determined by exposing 0.200 grammes of the quinine salt, which had been, as well as the salt of the new alkaloid, first carefully dried at + 10° R., in a platinum crucible for six hours, at a temperature of + 80° R. When after some time no loss in weight was perceptible, the weight of the evaporated water, amounted, on an average of three experiments, to only 0.0113 grammes.

The proportion of phosphoric acid was determined by placing 0.200 grammes of the salt in water, adding to the heated mixture diluted acetic acid by drops until the salt was perfectly dissolved, and then mixing this solution with a slight excess of neutral acetate of lead dissolved in water, and slightly acidulated with acetic acid. As the mean of three experiments, 0.112 grammes of tribasic phosphate of lead were obtained, and by evaporating the filtered liquid to dryness whilst adding subcarbonate of soda and some sulphate of soda, and treating the dry, finely-powdered residue with ether, 0.1688 of quinine dried at + 80° R, were separated.

The thus obtained phosphate of lead dissolved very easily, and without leaving any residue, in diluted nitric acid, and contained, consequently, no trace of sulphate of lead; the decomposition of the sulphate had consequently been perfectly effected.

The result of a former analysis of the combinations of phosphoric acid with oxide of lead, showed, that the tribasic phosphate of lead contains 19.765 per cent. of phosphoric acid. 0.112 grammes of this salt correspond therefore to 0.0221368 grammes of phosphoric acid. The composition of the phosphate of quinine, would therefore be,

	Per cent.
0 1667332 quinine (calculated by the loss)	83.3666 quinine
0.0221368 phosphoric acid	11.0684 phosphoric acid
0.0111300 water	5.5650 water
0.2000000	100.

This corresponds to the combination of

		Per cent.
3 atoms quinine $_3$(2055.512).....	6166.536.....	83.063
1 " phosphoric acid	892.310.....	12.375
3 " water.....	337.434.....	4.562
	7396.280	100.

The phosphate of the new alkaloid was analyzed in the same way as that of quinine. 0.200 grammes lost, as a mean of three experiments, the results of which agreed exactly with one another, 0.034 water; the same quantity yielded 0.1035 grammes of phosphate of lead, and the filtered solution 0.1446 alkaloid.

The composition is, accordingly:

	Per cent.
0.145143225 alkaloid (calculated from the loss)	72.5716125 alkaloid
0.020456775 phosphoric acid	10.2283875 phosph. acid
0.034400000 water	17.2000000 water
0.200000000	100.

This corresponds to the combination of

			Per cent.
3 atoms	alkaloid	6166.536	73.336
1 "	phosphoric acid	892.310	10.612
12 "	water	1349.738	16.052
		8408.584	100.

From this results the interesting fact that the composition of both salts is analogous to that of the inorganic phosphates, and differs with respect to each other only in the different proportions of water. This in the quinine salt, is just sufficient to convert the existing quantity of phosphoric acid into tribasic acid; and in the salt of the new alkaloid, to form with the phosphoric acid, tribasic acid, and with the anhydrous alkaloid (considering the composition of the hydrate of quinine as the standard) the hydrate.

The conclusion which we are justified in drawing from the results of these experiments, is, that the examined alkaloid, which, according to its composition, is identical with the anhydrous quinine, is still an independent, peculiar combination; for, 1, it is contained in the bark, together with quinine; 2, in decomposing the salts it separates in the anhydrous state; 3, the proportion of water in some salts has been found considerably different from that of the corresponding quinine salts; and, 4, I did not succeed in obtaining the quinine in the described crystalline form and free of water. I call this alkaloid *Quinidin* (*Chinidin*).—*Buchner's Repertorium.*

MULDER'S OPINION OF QUINOIDINE.

With some Observations thereon, by the Editor of "Buchner's Repertorium."

The following three positions may be considered as undeniable:

(1.) Quinine is a specific medicine, for which there is no other perfect substitute.

(2.) From the chemical similarity, from the isomeric or polymeric constitution of two or more substances, no certain conclusion can be drawn as to their pharmacological similarity or equality; medical experience can alone obtain a correct judgment on this point.

(3.) The brown amorphous substance which remains behind in the mother-liquor in the preparation of the sulphate of quinine, and which is precipitated by the saturation of the liquor with a carbonated alkali, and which appears after drying as a blackish-brown resinous mass, is a more or less impure, perhaps intentionally adulterated, uncertain refuse, which coming from the manufactory, and being sold by the Druggist under the name of Quinoidine, ought not to be employed medicinally.

These assertions certainly cannot be controverted; but Mulder goes still further, and undoubtedly too far, when he denies that quinoidine possesses any medicinal properties.

It is probable that Winckler's method of purifying or preparing *pure quinoidine* is unknown to him; and that he is also unacquainted with the experience of many German physicians, and of many successful cures effected by it. There is no doubt that quinoidine prepared according to Winckler, and which was analyzed by Liebig, under the name of amorphous quinine, is a peculiar and very effective cinchona alkaloid, which is hardly inferior, in pharmacological value, to the white and crystallizable quinine, although not identical with it.

Mulder has apparently analyzed only impure commercial sorts of quinoidine, and therefore nobody will be surprised to hear that he found in one sort 8.04 and in another 9.54 per cent. of nitrogen; in one sort 73.14,

and in the other 74.33 per cent. of carbon, and then calculated from these analyses the following result, taking 1 atom C.=75, 1 atom H.=6.25, and 1 atom N.=87.5.

COMPOSITION OF QUINOIDINE.

	I. Found. Per cent.	I. Calculated. Per cent.	I. Calculated. Atoms.		II. Found. Per cent.	II. Calculated. Per cent.	II. Calculated. Atoms.
Carbon.....	73.14	72.9	42	.....	74.33	74.5	36
Hydrogen ...	7.69	7.4	52—54	.....	7.57	7.6	44
Nitrogen.....	8.04	8.1	4	.....	9.54	9.6	4
Oxygen	11.13	11.6	5	.....	8.56	8.3	3

QUININE.

	Calculated per cent.	Atoms.
Carbon	74.1	20
Hydrogen	7.4	24
Nitrogen	8.6	2
Oxygen	9.9	2

Even if, as Mulder believes, the deviations originate from the quinoidine being a mixture of two different cinchona-alkaloids, still these are so related one to another in a chemical point of view, as well as in pharmacological respects, that the calculated deviation in the per-centage proportion of the elements can have no great influence upon the medicinal effects; it is well known that the sulphate of quinine contains sometimes sulphate of quinoidine and cinchonine, and that it is nevertheless not to be rejected as a medicine.

Among first class medicines, opium, acetate of morphia, nux vomica, strychnia and veratria, there have often been discovered chemical deviations; but these have not been in consequence rejected from the Materia Medica. The quinoidine purified after Winckler's method is as good a cinchona-alkaloid as quinine is; and, according to medical experience, it is hardly inferior to the latter, even if two or even three different kinds of alkaloids should be contained in it. It would be a most wasteful proceeding if we were obliged to throw away such an effective medicine merely because this species of cinchona-alkaloid cannot be obtained colourless and crystallized. It must, however, be admitted that no apothecary ought to dispense quinoidine in the state in which he receives it from the manufacturer or druggist, without having it first carefully purified.—*Buchner's Repertorium*, Bd. xlviii.

ON THE COLOURING MATTER OF ANCHUSA TINCTORIA.

BY DRS. BOLLEY AND R. WYDLER.

It is well known that the pigment of the so-called spurious alkanet root is one of the least permanent vegetable colours. Its solutions are changed by boiling; and the mere influence of the light spoils them after some time. We therefore undertook to discover the alterations effected in the substance itself, and which must accompany the well-known changes in its outward appearance.

Having, therefore, ascertained that water by coming in contact with the root assumes a brownish colour, the root was treated, before the extraction of the red pigment from it, with cold water.

A few pounds of the root cut in pieces, were placed in a sort of displacement apparatus, treated with water, and the latter renewed as long as the effluent liquid had a yellow colour. The apparatus consisted of a large bottle, with doubly perforated cork; a syphon-shaped tube which reached to the bottom of the bottle, served to admit water, whilst another syphon reaching only a little below the cork, conducted off the coloured water.

The liquid, which at first ran off with a rather dark brown colour, and afterwards for some time, slightly coloured yellow, possessed an acrid bitter taste, re-acted slightly as an acid, showed, although not quite distinctly, the re-action of tannin, left after the evaporation a brown mass behind, of similar taste, and manifested in general all those characteristics, which procured for it a place among the so-called extractive matters.

The moist roots were now dried on hurdles in the dry oven, at a not very high degree of heat, and then treated in Real's press with ordinary spirit of wine, till the last portions presented merely very diluted solutions of the pigment. In order to regain a part of the spirit, the spirituous extract was submitted to distillation in a retort. As soon as it began to boil, the red colour became cloudy violet, and at last greyish green, as Pelletier and John had observed. We soon found, however, a means of preventing the decomposition of the pigment during inspissation, in the addition of a few drops of muriatic acid. This discovery is of some importance for the manufacturer, as he is no longer under the necessity of using up the extracts as soon as possible, and as also the diluted solutions, which run off at last, may be concentrated.

In this manner the greatest portion of the spirit of wine was now removed by distillation, and ultimately on the water-bath. The residual thickly-clouded liquor, from which the pigment was already partly removed, was shaken with ether, which assumed a deep red colour; water was then added, and the whole repeatedly shaken.

The ethereal fluid floated clear on the top; the acid, slightly reddish brown water, was removed by means of a syphon, fresh water was added, and in this way the washing was continued, until the ethereal fluid had diminished and become perfectly viscid.

After the ether had been evaporated, a dark red, resinous, brittle substance remained behind, which possessed in general all those characteristics ascribed to it by Pelletier, except one, namely, that the solutions of the same re-acted acid; this we must contradict. The solution of this substance colours neither litmus paper red, nor is it able to suspend the influence of potash upon curcuma paper, even if a large quantity of the solution be taken to one drop of potash. The spirituous solution of this red substance is coloured blue by alkalies; acids throw down brown-red flakes. A spirituous solution of chloride of tin produces a violet colour in it, but we could not discover a precipitate, even after many days standing. With chloride of iron a slight precipitate appears, and a strong olive-green colour. A spirituous solution of sugar of lead produces no precipitate, but with acetate of lead a grayish-blue precipitate falls down. This lead-precipitate is very soluble in spirit of wine, for, even by a considerable surplus of acetate of lead, the tincture cannot be decolourized, and the spirit of wine, which has been employed for washing the precipitate, shows, by re-action, distinctly the presence of lead: the precipitate diminishes, and becomes changed in its composition, in proportion to the continuation of the washing.

The elementary analyses of this substance, as well as of the products of decomposition, were all performed with chromate of lead.

Found.	Formula.	Required.
Carbon.....71.33	C_{35} H_{20} O_8.	Carbon.....71.43
Hydrogen 7.00		Hydrogen 6.80
Oxygen 21.67		Oxygen 21.76
100.00		99.99

The proportion of oxide of lead in the precipitates of lead varied between 50 and 77 per cent; so that the experiments, with regard to the determination of the equivalents, could not be continued.

In order to obtain some of the products of decomposition, which are

formed by boiling the red solution of the pigment, a portion of the red extract was poured into a glass balloon, provided with a bent glass tube, in order to emit the spirit of wine, and heated. Soon after it commenced boiling the above-mentioned change of colour took place. We continued, however, the evaporation on the water-bath, until a dry residue remained. The latter, of a dark-green colour, was treated with water, which assumed an intense brown colour; whereupon the dissolved part was filtered off and washed repeatedly with fresh quantities of water, until it ran off colourless.

The dark-coloured portion, which had not been dissolved in water, was treated with ether, by which a large portion was dissolved with a beautifully green colour. The brown watery solution, as well as the green ethereal, were evaporated on the water-bath to dryness : in several repetitions of the same procedure, there was always more obtained of the latter than of the brown solution.

The green substance, which we will call *alkanet green*, could be dissolved in spirit of wine, but not to a great degree ; in transmitted light the solution looked more violet than green; diluted solution of potash admitted only little of it with a greenish colour. Muriatic acid precipitated out of the latter solution the organic substance, in the form of brownish-green flakes.

Found.			
I.	II.	Formula.	Required.
Carbon 69.81	Carbon 70.35	C_{34} H_{22} O_8	Carbon 70.34
Hydrogen... 7.69	Hydrogen... 7.52		Hydrogen... 7.64
Oxygen.....22.50	Oxygen.....22.13		Oxygen.....22.06
100.00	100.00		100.00

This formula, compared with the former, shows that the green substance has been formed from the red by the decomposition of two atoms of water, the hydrogen of which combined with the red substance and formed the green, whilst the two atoms of oxygen separated by forming carbonic acid with one atom of carbon,

$$C_{35}\ H_{20}\ O_8 + 2\ H\ O = C_{34}\ H_{22}\ O_8 + C\ O_2.$$

The decomposition of this substance is perfectly similar to the conversion of sugar into spirit of wine and carbonic acid, or, to take an example from the pigments, that of the erythrinic acid, which is contained in *Rcelloa tinctoria*, and which turns into orcin by the absorption of water and separation of carbonic acid.

Guided by the elementary analyses, we tried to discover whether carbonic acid is emitted during the spontaneous decomposition of the red pigment, and arrived at the conviction that this is actually the case.

Although such cases are not very rare, still they are most frequently caused by the presence of some nitrogenous substance, or by some alkali, usually by ammonia. This consideration, together with the above-mentioned discovery, that muriatic acid checks the decomposition, urged us to search for such an agent, which might justify us in placing this apparently isolated fact among the number of well-known phenomena, and upon examination we soon discovered that the brown substance is not free from nitrogen.

A large quantity of the washings, containing muriatic acid, from which the red substance dissolved in ether had been separated, was evaporated in a water-bath to dryness. The reddish-brown residue, being heated with potash, developed distinctly a smell of ammonia. Being placed in a retort, and strongly heated *by itself*, it formed a whitish fibrous sublimate, which, upon breaking off the neck of the retort, was easily recognised as sal-ammoniac. Nitrogen was, therefore, present, not in the form of an organic combination, but (partly at least) as *ammonia*. The brown product, which formed itself,

besides the green one, from the extract that had not been mixed with muriatic acid, gave the same result, and, finally, we found also *ammonia* in the brown extract, which we had obtained by the preparatory treatment of the root with water.

That the decomposition had actually been caused by the presence of ammonia, we could prove in a direct manner, for the undecomposed red pigment having again been dissolved in spirit of wine, it was boiled for four hours, under repeated restoration of spirit of wine, without altering its colour; a small addition, however, of the brown watery ammoniacal extract, or of free ammonia, soon turned its colour.

The *brown substance* possesses the following characteristics:—it dissolves easily in water, better in hot than in cold water; it dissolves neither in ether nor in alcohol. Alkalies precipitate the solution somewhat darker, and the latter precipitates several metallic salts. If slowly evaporated, under the admission of air, it acquires a strong acid reaction.

We found it composed as follows:—In 100 parts there are

Mean.	Formula.	Required.
Carbon 40.05	$C_{29}\ H_{15}\ O_{28} + N\ H_4\ O.$	Carbon 39.61
Hydrogen 4.32		Hydrogen 4.55
Oxygen 52.51		Oxygen 52.84
Nitrogen 3.12		Nitrogen 3.19

ON THE ACTION OF NITRIC ACID ON BRUCINE.

BY S. G. ROSENGARTEN.

GERHARDT states* that he obtained nitric ether by treating brucine with nitric acid, whilst Liebig obtained a liquid whose qualities differ from those of nitric ether. Laurent recently repeated this experiment †. He operated with fifteen grammes of brucine, and allowed the developed gas to pass over quick-lime, condensing it afterwards by a freezing mixture. In this way he obtained one gramme of a liquid which was very fluid, lighter than water, and possessed the odour of nitric ether. He rectified it at a temperature which did not exceed 54°5 Fahr., and the analysis showed 29 per cent. carbon, and 6 per cent. hydrogen; nitric ether contains 32.0 per cent. carbon, and 6.6 per cent. hydrogen. Notwithstanding the great difference of 3 per cent. in the proportion of carbon, Laurent still maintains that the gas developed at common temperatures is nitric ether.

When the action of the nitric acid at ordinary temperatures is finished, the residue forms an orange-red mass, and Laurent succeeded in crystallizing the same (how? he does not say). This substance, which he calls *cacothelin*, yielded, when analysed, results which lead to the formula $C_{42}\ H_{22}\ N_4\ O_{20}$. If to one equivalent of brucine three equivalents of nitric acid are added, and one equivalent of nitric ether, and two equivalents of water subtracted, the formula for cacothelin remains.

The great difference however, between the composition of the volatile product and that of the nitric ether, rendered a fresh examination desirable, which Rosengarten instituted in the following manner:—

In order to obtain the evolved gas, nitric acid of specific gravity 1.4 was poured over fused brucine in the cold in a small retort. Copious evolution of gas took place, with simultaneous generation of heat; red vapours appeared, but only in very small quantity. The gas was first conducted through a tube of two feet length, containing hydrated lime, and then through an equally long tube, containing chloride of calcium; it burnt with a green flame coloured solutions of iron immediately black, and was

* *Annalen der Chemie und Pharmacie*, Bd. lvii, s. 94.

† *Comptes Rendus*, t. xxii, p. 633.

absorbed with very great facility by concentrated sulphuric acid ; the latter assumed gradually a beautiful blue colour, which after a while changed to red.

When a few drops of water were added to the acid, a strong development of gas took place, red vapours having the smell of nitrous acid appeared. From the want of ice, all attempts to condense the gas were fruitless ; the gas was, therefore, analysed by connecting the before described apparatus with a long combustion tube. The tube was provided as usual, with a chloride of calcium tube and potash apparatus, and filled partly with fresh heated copper turnings, partly with oxide of copper. Every necessary precaution was taken to remove the hygroscopic moisture.

The experiment was made with about ten grammes of brucine.

The result was 1.1615 C O_2, and 0.719 H O, a proportion in equivalents as 4 : 6.05.

Six grammes of brucine yielded 0.550 C O_2, and 0.3598 H O, a proportion in equivalents as 4 : 6.38.

This differs very much from the proportions of carbon and hydrogen in the different sorts of ether. The re-action cannot, therefore, be so simple as Laurent and Gerhardt suppose. Part of the residue was treated with alcohol, as Gerhardt had done ; the colour after drying it was reddish-yellow, but not beautiful.

The analysis in per cent. was—

	I.	II.
Carbon	51.68	51.86
Hydrogen	5.44	5.51
Nitrogen	13.58	"
Oxygen	29.30	"
	100.00	

The only method by which it was possible to crystallize a rather large quantity of this substance, was dissolving it in water which was strongly impregnated with nitric acid. The *cacothelin* crystallized in beautiful yellow laminæ, which, under the microscope, appeared to have a regular crystalline form. The analysis of the same was in per cent.,

	I.	II.	$C_{42} H_{22} N_4 O_{20}$
Carbon	51.57	51.50	51.43
Hydrogen	4.75	4.80	4.48
Nitrogen	12.69	"	11.43
Oxygen	30.99	"	32.66
	100.00		100.00

The solution of this substance, mixed with nitrate of ammonia and oxide of silver, yielded a flocculent precipitate, and the same also occurred with the salts of quicksilver and lead. When heated, the silver salt explodes. The silver contained therein was several times tried to be estimated as chloride of silver, but the results were not uniform. The re-actions of this substance agree with those mentioned by Gerhardt. By exposing brucine to the influence of oxide of manganese and sulphuric acid, a substance was obtained in the distilled watery liquid, which possessed a peculiar smell, and reduced nitrate of silver with a very beautiful brilliancy ; by potash it was unchanged, it was not therefore, aldehyd. Formic acid was also not contained in it.—*Annalen der Chemie und Pharmacie,* Bd. lxv., Heft 1.

MICHROCHEMICAL EXAMINATION OF ANIMAL TISSUES.

BY DR. DONDERS,

Lecturer on Anatomy and Physiology in the School for Army Physicians at Utrecht.

(*Continued from p.* 441.)

2. Other *alkalies* we have seldom employed. But I think a solution of *soda* will have the same effect as that of potash.

3. Of much less effect, however, is *ammonia.* So much we have observed, that it operates very slowly, and that most of the elementary formations, which are soluble in potash, are but slowly affected by it. If muscular tissue be kept for some days in ammonia, the primitive bundles, and especially the nuclei of the muscular bundle of amphibious animals, appear somewhat swollen. At the same time, a rather large quantity of a white pulverized substance collects in the fluid, which, under the microscope, appears finely granular and amorphous.

Of greater importance is the use of ammonia for the saturation of acids, which have operated upon some elementary formations; those undissolved parts, which have only become pale, reappear, and those which swell up into a gelatinous substance, show themselves again in their original form. (Vide *Acetic Acid.*)

4. *Acetic acid.*—No reagent was so frequently and so indiscriminately employed as acetic acid, and that on account of the quickness with which it operates. Only in individual cases a long-continued action of the same affords some advantage, and generally its application at the moment of the examination is already sufficient to produce the desired effect. The results of our experiments relate, therefore, chiefly to a longer-continued operation of this acid. The character by which acetic acid is distinguished from others is, that it makes transparent those elementary forms, which otherwise, particularly if examined by transmitted light, are not so well to be distinguished. This circumstance facilitates especially the recognition of fundamental structures, and of organic parts, which remain unaltered in acetic acid, by the others becoming transparent, they appear more sharply marked and more distinct, as most of the nucleated forms, elastic fibres, &c.

Those elementary forms, which, like the walls of many cells, the elastic fibres, &c., resist a long time the influence of potash, are also insoluble in acetic acid. But also many others, which are soon affected by potash, are only slowly, or not at all, dissolved by acetic acid, such as the cellular tissue fibre, the walls of the nerve tubes, most nuclei, &c.

The walls of *horny cells* resist acetic acid, which only renders them paler. The cells of the epithelium of the serous membranes become distinctly separated as soon as acetic acid is added. Those of the cavity of the mouth become paler, whilst their nucleus appears more distinctly upon the addition of diluted acetic acid; but if exposed for a longer space of time (*e. g.* for an hour) to the influence of concentrated acetic acid, their contents become quite clear, the granules scattered round the nucleus disappear and are dissolved, and even the nucleus itself becomes paler, and appears no longer able to resist the continued influence of the acetic acid.

It deserves to be noticed, that the cells lose, at the same time also, their flat shape, and assume a more globular form. An addition of ammonia darkens again the pale cell walls, and produces a granular precipitate.

The corneous laminæ of the epidermis do certainly become paler by acetic acid, but are not in the least dissolved. Even after having remained for six months in concentrated acetic acid, they were unaltered and equally flat as before. The contents have consequently during their cornification become insoluble in acetic acid, and the cornification itself appears to consist in a metamorphosis of the contents, by which these dry and become in-

soluble in acetic acid, but remain soluble in potash. The hairs are not perceptibly changed by acetic acid.

The fibres of cellular tissue, with the exception of those of the interarticular fibro-cartilages, which appear to differ from true cellular tissue fibres, from whatever part they may be taken, become gelatinous by diluted acetic acid, also transparent, and are no more to be recognised; still they are not dissolved, even if macerated for several hours in concentrated acid in common temperature. This is proved by the fact, that the fibres, if the acetic acid be saturated with ammonia, appear again as distinctly as before, and shrivel again together, whilst losing their gelatinous character. The elastic fibres which are met with between the cellular tissue fibres, appear immediately on the application of the acetic acid, as if they were isolated, and separate one from another. When on the addition of ammonia, the swollen cellular tissue fibres shrivel again together, the elastic fibres also again approach one another. The circumstance that the elastic fibres separate from one another if acetic acid be added, gives an opportunity to judge from the transverse sections in some degree, of the quantity of binding tissue fibres which fill the intervals between the elastic fibres. This separation, after the addition of acetic acid, and shrivelling together by ammonia, is very distinctly seen on transverse sections of the veins of the *Tunica adventitia* and *elastica*, of the arteries, of the yellow ligaments, of the vocal ligaments, &c., all of which contain fibres of cellular tissue.

Elastic fibres are absolutely insoluble in acetic acid. After six months maceration in concentrated acid, they are still unaltered.

The intercellular substance of true cartilages and the fibres, which are sometimes found in it, are not dissolved by acetic acid. After having been for twenty-four hours exposed to the influence of concentrated acid the *intercellular* substance was unaltered, both with regard to its granular and fibrous nature; only after four days the fibres appeared gelatinous, at least less dark, and less distinctly marked.

The fibres of the intercellular substance of fibro-cartilage (*intervertebral cartilages*) become somewhat paler and more transparent by acetic acid without swelling. No farther change takes place if the influence of concentrated acid be continued for twenty-four hours.

The substratum of the elastic cartilages (*ear cartilage*) is not changed by acetic acid.

The cartilage corpuscles remain in the beginning unaltered. If the application of concentrated acid be continued for forty-eight hours, the cells and even the nuclei swell; they become more globular and paler, whilst the outlines of the (partly dissolved ?) *cartilage corpuscles* become less marked. Of each cartilage corpuscle there ultimately remains distinctly behind only the group of cells which has somewhat increased in circumference. If the nuclei of the cartilage cell be deprived by ether of the fat they contain, so as to appear as folded little bags, they expand again, if treated for some time with acetic acid into globular bags by being filled with the acid.

Bone cartilage becomes pale by acetic acid and somewhat more transparent, especially if long exposed to its influence; but in other respects no material changes take place.

Fat cells of the sheep, of the cow, and of the calf, become isolated very easily in concentrated acetic acid. The innermost membrane (*membrana propria*) of the fat cells is not affected even after several days; the fat cells of the cow, calf, pig, and of man, are then found swollen, almost perfectly globular, and less shining, but the fat is still contained in the cells; those of the sheep remain polyedric and unaltered.

The walls of the *capillary vessels* do not dissolve in acetic acid. The epithelium, the fenestrated membrane, and the elastic fibres of the vascular walls remain unaltered. On a transverse section the elastic fibres and

lamellæ of the walls of the veins, are seen strongly to recede from one another, from the tunica adventitia to the fenestrated membrane, by the swelling of the interjacent cellular tissue fibres. In the walls of the arteries this takes place only in the cellular and proper elastic coats, but not in the circular or longitudinal fibrous coats, in which the elastic lamellæ are separated from one another by closely-compressed muscular fibres, which are interwoven with thin elastic fibres.* After a lengthened operation only the elastic fibres and lamellæ remain behind strongly marked.

Fresh *blood* being mixed with an excess of concentrated acetic acid, the blood corpuscles dissolve quickly, and upon addition of ammonia only a granular precipitate is formed. If dried blood be mixed with acetic acid, it becomes also immediately paler in colour, and the blood corpuscles disappear soon, but become sometimes again visible after an hour by the addition of ammonia. If only a small quantity of acetic acid be added to the blood, the blood corpuscles are only apparently dissolved; on being saturated with ammonia they appear again.

The blood corpuscles of the blood, that had been preserved during many months in alcohol, are only slightly altered (swollen and discoloured) by acetic acid acting upon them for several hours, and do not dissolve at all, or only very slowly.

Organic or involuntary muscular fibres become immediately discoloured and more transparent by the action both of concentrated and diluted acetic acid; they swell, however, but very little, and remain always recognisable, so that this peculiarity distinguishes them already from the cellular tissue fibres. If they have been kept at common temperature for several hours in concentrated acetic acid, they swell, become more discoloured, and are not easily recognised; but upon the addition of ammonia they become again distinctly visible.

The striped primitive bundles of voluntary muscle swell instantaneously by the application of diluted and concentrated acetic acid; they become paler and more transparent, and the primitive fibres less distinct; the transverse lines appear very distinct, even where they have not been so before, and the nuclei are pointedly marked. If treated for twenty-four hours, and even longer with concentrated acetic acid, the bundles are much swollen, the sarcolemma, undissolved; at the ends the gelatinous contents issue, the nucleus and transverse lines are distinct, and the primitive fibres generally invisible. On the transverse section it is distinctly to be seen, that the muscular substance between the primitive fibres is considerably swollen; the latter, namely, which occur also in the centre, are more distant from one another, but are distinctly to be recognised as glittering spots; these spots correspond with the varicose swellings of the primitive fibres, the interlacement of which have become invisible. The consequence of this is, that there are to be seen on the surface everywhere transverse lines, each of which corresponds with one of the small spots situated in one plane, and that primitive fibres are scarcely distinguishable. The nuclei are very distinct, narrow, long and sharply marked; in amphibious animals they are almost all scattered in the bundles between the primitive fibres, and only few in or near the sarcolemma, as is very distinctly to be seen on a transverse section.

The *nerve tubes* become, by the addition of diluted acetic acid, immediately granular and darker, particularly if compared with the surrounding cellular tissue fibres, which swell into a substance like gelatine. This acid is, therefore, very available for examining both the fibres of the cerebrospinal and those of the sympathic nerves.

If concentrated acetic acid be allowed to operate for one or more hours upon the fibres of peripheral nerves, the sheath becomes pale without being

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* Small vessels may be dried on a small cylindrical twig, introduced into the lumen of the same, in order to obtain a transverse section of the walls.

dissolved, the contents swell, and become transparent and gelatinous, so that the nerve tubes become much thicker, and want the double outline. In the gelatinous contents, a very thin, more or less spirally running, and here and there interrupted, small cylinder is perceived, which has a glittering appearance, and is not altered by acetic acid. If the fibres have, before the application of concentrated acetic acid, been well acted on by ether, they appear much thinner, and the cylindrical axis, as well as the just described small thin cylinder, are wanting. They are, consequently, both of the same nature, and consist of fat. By repeated pressure, the swollen contents may, for the greatest part be removed out of the short tube, and at the edges of the empty tube, which has been flattened by the compressorium, it may be seen that the wall is about $\frac{1}{600}$ M. M. thick. All these observations relate equally to the sympathetic fibres of Bidder and Volkmann, especially to those of the connecting branches of the ganglia of the sympathetic with the spinal nerves of the frog. If we consider at the same time that the effects of potash upon both kinds of nerves were absolutely equal, there remains no doubt but that both are, in the most essential parts, identical with one another.†

The envelope of the nerves are also not dissolved by acetic acid, even after many day's exposure to it.

The contents are not dissolved in diluted acetic acid (consequently cannot be merely dissolved albumen), but are perfectly dissolved in concentrated acid after some time. The so-called cylindrical axis of Purkinge and Rosenthal is the fat, which, after death, separates from the albuminous contents.

The *ganglionic globules* of the brain and spinal marrow become more distinct by diluted acetic acid ; they become darker and more granular, and a surrounding membrane is distinctly to be seen, the innermost cell and nucleus become likewise visible. By a continued application of concentrated acetic acid, they become discoloured, swell, and appear after a few days quite dissolved, individual fat globules only remaining.

The exterior membrane of the peripheral ganglionic globules (particularly distinct in the ganglion gasseri of the cow, in which the ganglionic globules have a very considerable diameter) consists of fibres with flat round nuclei, which latter are lying with their flat side along the surface, and consequently appear very thin at their edges, and globular in the centre. Concentrated acetic acid expands this membrane—it becomes gelatinous, and peals easily off by being rubbed between two glass plates, whilst the nucleus remain unaltered. The contents are now enclosed only in a transparent membrane, and swell by the continued influence of acetic acid like gelatine ; at the same time they lose their very distinct cellular structure, and are at last dissolved, after bursting the interior membrane, which is insoluble. Of the innermost cell I found, after thus being dissolved, no traces not even upon the addition of ammonia.

(*To be continued*).

THE ASPARAGUS OF THE COSSACKS (*TYPHA LATIFOLIA*).

[The following is extracted from an article by M. Morren, in the *Journal d'Horticulture de Gand*, for March 1848.]

The authors of a humorous publication at Brussels introduced, in 1847, the subject of the potato disease into their pages. They have enumerated, in verse, the names of varieties of the famous *Solanum tuberosum*, and have called the attention of horticulturists to the potato of Bokhara, that reputed

† There cannot exist any doubt about the identity of these two kinds of fibres, and they must be distinguished according to their relation to the central organs. The fibres, whose central organs are peripheral ganglia, are generally thinner, still their thinness does not permit us to conclude from it the nature of the central organ.

happy capital, inhabited by Tartars, Jews, Turcomans, Mussulmen, and Cossacks. Our friends, however, have humbly acknowledged that they are entirely ignorant of the nature of this potato; but thanks to the kind of freemasonry which exists among botanists throughout the world, we are enabled to put this extolled plant into the hands of these same friends. We at last obtained the potato of Bokhara; but, behold! on opening the box, we soon perceived that it was not a Solanum, but a totally different plant, with which we had long been familiar; and, on referring to Dr. Clarke's Travels, we found we had before us the history of this pretended potato of the Bokharians. The plant which they eat instead of potatoes is an aquatic. For three centuries it has been called by the French *Marteau* or *Masse*; the Greeks have named it τοφη; the Latins, *Typha*; the Germans, *Quarrenkolben* or *Liefsknopsen*; the Flemings, *Lisch-dodden*, or simply, *Donsen*. It is the *Typha latifolia* of botanists.

We cultivate the *Typha latifolia* as an ornamental plant in ponds, but it naturally abounds in our waters where the depth is not too great. M. de Pitteurs Hiegaerts had many thousand stems from the Lake of Léau; and if we are correctly informed, the leaves were only employed for litter, and the dried stems and rhizomes for fuel. What a glorious feast they would have afforded, when young, for the Cossacks! In the Campine Limbourgeoise the ponds are full of these plants; and they have commenced to propagate themselves in the pieces of water on the line of the Vesdre, on both sides of the railroad.

Of all the authorities we know, Dr. Clarke is the one who gives the fullest details respecting the utility of the typha. He found the inhabitants of Tcherkask so enthusiastic with respect to the excellence of the shoots of the typha, that they regarded it as a sacred plant, a special gift of Providence. The lower parts of the stem are brought to the table at every meal, and in every house bundles are to be found, about three feet in length tied like asparagus, ready for use. It is sold in the markets, and amongst the provision merchants. It is best used in spring, like our asparagus, when the plants begin to shoot. It is said that in this state it forms a dish which those that have once partaken of desire again with increasing relish.

The Cossacks are still more choice in their use of the typha. They peel off the cuticle and select the blanched tender part, usually about eighteen inches in length, near the root, and this constitutes a dish, cool, agreeable, and wholesome. "The Cossacks, rich or poor," says Dr. Clarke, "young or old, prefer this vegetable to all others;" and from his own experience, during his sojourn among the inhabitants on the banks of the Don, he could testify that the typha was a very nutritious and excellent dish.

The typha is prepared like asparagus, being cut, like the latter, when the young shoots are pushing; the tender blanched part is boiled in water seasoned with salt, and served up in the same way as asparagus. The various culinary preparations to which the asparagus is subjected, is equally applicable to the typha; for it may be cut, stewed, prepared for serving up with yolk of eggs, enhancing the flavour with nutmeg and salt. The typha, therefore, which ornaments the sides of our lakes and ponds with its elegant foliage and singular tops, may be turned to useful account, for although the plant is eaten both by Tartar and Cossack, that is no reason why one, being neither, should not avail himself of that which God has created good. Even the French cooks employ various culinary plants for which we are indebted to the Cossacks, among which we may mention tarragon, and a delicious rhubarb. [It is stated in the *Vegetable Kingdom*, page 126, that "the rhizomes of typha abound in starch." This being the case, its nutritious qualities cannot be doubted.] — *Gardeners' Chronicle.*

ON THE DETECTION OF STARCH-SUGAR IN CANE-SUGAR.

BY DR. C. REICH.

The adulteration of cane-sugar and its syrups with starch-sugar and starch-syrup is not unusual. As both starch-syrup and starch-sugar usually contain dextrin, and often gypsum, when they have been manufactured by sulphuric acid, instead of with malt, we have in alcohol an easy and safe test, as both dextrin and sulphate of lime are precipitated by it. We dilute the syrup with double its quantity of water, and shake it with alcohol of 80 or 90 per cent. when the sugar remains in the solution.

If, however, the syrup or sugar contains neither dextrin nor gypsum the detection of the adulteration is more difficult; for the optical sugar-test by means of the polariscope of Biot and Ventzke is not safe enough, and, moreover, the apothecary seldom possesses this instrument; also Trommer's sugar-test, by heating the alkaline solution of sugar with sulphate of copper is not to be perfectly relied on.

A better reagent is *concentrated sulphuric acid*, which chars cane-sugar and at the same time forms from it formic acid, whilst it forms with starch-sugar a distinct chemical combination, saccharo-sulphuric acid, discovered by Peligat, which forms with almost all bases soluble combinations, and is, consequently, not precipitated by carbonate of baryta. In order, therefore, to discover the presence of starch-syrup in cane-sugar syrup, the latter must first be exposed in a vapour-bath until it is almost dry, and heated to the melting point of starch-sugar, and then a slight excess of concentrated sulphuric acid is to be added to it by drops, lessening at the same time the too strong heat by cooling. In half an hour the mixture is to be dissolved in twenty parts of distilled water and filtered, and carbonate of barytes added to the filtered liquid to saturation, and the liquid again filtered from the sulphate of baryta, and from the surplus of carbonate of baryta. If now sulphuric acid cause in the filtered liquid a precipitate of sulphate of baryta, starch-sugar was present, and saccharo-sulphuric acid has been generated.

This method also offers difficulties, and Dr. Reich discovered a still better one by testing with bichromate of potash. If a thick, pure, cane-sugar syrup be mixed with a boiling-hot concentrated watery solution of bichromate of potash, and the mixture heated in a test-glass to the boiling point, and the heat then removed, a reciprocal reaction goes on, and the syrup has acquired, from the oxide of chrome which is formed, a deep green colour, which appears particularly beautiful when the liquid is diluted with water. This phenomenon is the result of the oxidation of the syrup and of the generation of an organic acid, which combines with the oxide of chrome, and remains dissolved in the syrup.

All other kinds of sugar remain indifferent to the bichromate of potash. If, therefore, starch-syrup (dextrine syrup) be treated in the same way no change takes place. If cane-sugar syrup be mixed with the $\frac{1}{3}$ or $\frac{1}{4}$ or $\frac{1}{8}$ part of the latter, this prevents the bichromate of potash from affecting energetically the cane-sugar syrup, the mixture froths a little more during boiling, but ceases to do so as soon as it is removed from the heat, without the liquid becoming green, and even when a small proportion of starch-syrup only is present, a coloration without energetic effect takes place, the colour is never so beautifully dark green, so that from the various shades of the colour the proportion of the starch-syrup (dextrine syrup) may be calculated.

The adulterations of solid cane-sugar with starch-sugar, however, cannot be discovered by this reagent, as it does not in the least affect a concentrated watery solution of pure cane-sugar and starch-sugar.

For discovering the latter adulteration, Dr. Reich found the nitrate of

cobalt very appropriate. Its effects are due to the relations of the potash-compounds of the starch-sugar and of the pure cane-sugar. If, for example, a small quantity of fused caustic potash be added to a concentrated watery solution of pure cane-sugar, the mixture heated to a boiling degree, and a solution of nitrate of cobalt dropped in, a beautiful bluish-violet precipitate of hydrate of the oxide of cobalt is formed, even when the solution was much diluted.

A concentrated solution of starch-sugar treated with caustic potash, and diluted with distilled water, gives no precipitate with nitrate of cobalt. If the solution of the potash starch-sugar be somewhat concentrated, a dirty-brown precipitate falls down on the addition of a solution of nitrate of cobalt. A small proportion of starch-sugar in cane-sugar prevents the formation of this bluish-violet precipitate by nitrate of cobalt, so that the latter is a safe re-agent for detecting the adulteration of the cane-sugar by starch-sugar.—*Buchner's Repertorium*, Bd. xlviii, Heft. 1.

ON SUMBUL ROOT.

The director of the Botanical Gardens at St. Petersburg, M. Fischer, says that the word *Sumbul* is applied in the East Indies to many aromatic plants. Thus the name of *Sumbul Hindi* is given to spikenard (*Nardostachys Jatamansi*); and the aromatic root of *Valeriana celtica* is called *Sumbul Ekleti* or *Sumbul Ekelti*, also *Sumbul Kumi* and *Sumbul Italicus*.

The *Sumbul-root*, known since 1840 in Germany was imported into Moscow and St. Petersburg by merchants from Khokand. About its origin nothing is as yet satisfactorily known; very likely it comes from some large umbelliferous plant which appears to be similar to *Archangelica officinalis*. Thielmann and others have given an exact description of this root, and Reinsch has examined it chemically. Physiological and clinical experiments have shown that it is in its effects quite similar to Angelica; it increases the energy of the digestive organs by a more active absorption and more ready assimilation of the chyle into blood. It restores the hæmatose functions, increases respiration, and the development of animal heat, accelerates the circulation of the blood, the assimilation and the secretions. It is prescribed like the angelica, as powder, tincture, aqueous infusion, and as infuso-decoction.

ON THE COATING OF GLASS AND PORCELAIN VESSELS WITH COPPER.

At the last exhibition of National Industry in Paris, glass and porcelain wares from Sevres, such as crucibles, retorts and evaporating basins, covered with a galvano-plastic coating of copper were exhibited. Similar vessels were exhibited at Berlin. The copper, according to Mr. Mallet, is applied in the following manner: the exterior surface of the vessel is smeared over with a thin coat of Canadian balsam, then strewed over with a fine powder of plumbago, and the latter connected with the copper pole of a galvano-plastic apparatus.

Dr. Mohr recommends the vessel to be first coated very thinly with copal varnish, then to be strewed over with bronzing powder, and this coating afterwards made perfectly smooth. The vessels are then filled with water, and placed in a solution of sulphate of copper, when the process of coppering is taking place.—*Buchner's Repertorium*, No. 145, p. 57.

ON CURAÇOA ALOES.

BY A. FABER.

Curaçoa aloes is imported from the Dutch West Indian Island, Curaçoa; but is not known in the London market. In Holland, it is not to be obtained regularly, and its production, therefore, no doubt, is only scanty. It is most like Cape aloes, but does not possess the greenish colour which is now and then perceived in the latter. It has always a more dull appearance, and like hepatic aloes, often has a liver-colour. It differs from the latter aloes, however, by its beautiful saffron-like smell. Last year its price at Amsterdam was 40 florins.—*Central Blatt*, No. 8, p. 126.

EMPLOYMENT OF PUMICE IN THE MANUFACTURE OF OIL OF VITRIOL.

According to Schneider, sulphurous acid can be converted immediately into sulphuric acid, by means of the porous substance pumice, and this substance may be employed in the fabrication of sulphuric acid of sp. gr. 1.845, without the necessity of leaden chambers, and of platinum retorts for concentration.—*Central Blatt*, No. 10, p. 160.

ON A SOLVENT FOR GUTTA PERCHA.

BY VOGEL AND BLENK.

Gutta percha dissolves at ordinary temperatures, and still better at a higher heat in sulphuret of carbon. The solution leaves behind on a glass plate, a thin coating possessing all the properties of gutta percha unaltered. Paste-board boxes may be adapted to contain water by being coated with such a solution, and may thus be made waterproof. The filtered solution smeared over white paper, forms a colourless coating.—*Central Blatt*, No. 11, p. 176.

ROYAL INSTITUTION.

On Friday, April 14th, Professor Faraday gave a lecture *On the Diamagnetic Conditions of Flame and Gases*, in which he explained and illustrated by experiment certain facts in relation to the influence of Magnetism on flame and gases, which have been developed in the course of some recent investigations by himself, and by two Italian philosophers, Bancalari and Zantedeschi.

He commenced by referring to the extraordinary power called *Magnetism*, which is readily and instantly induced in a bar of soft iron by the influence of electricity. A very large and powerful horse-shoe magnet of this kind was used for illustration, in which the magnetic force was excited by a galvanic battery of ten of Groves's cells. The immense power of this magnet, when thus excited, was shewn by placing a bar of iron across the poles, which thus became immoveably attracted; yet, on breaking contract in the galvanic circuit, this power was immediately lost. It was by using magnets of this description, of great size and power, that the effects to be described had been noticed. It was found from experiments that all substances were influenced by the magnetic force, some being attracted while others were repelled. This had been observed with reference to solids and liquids some time ago. Those substances that are attracted are

called *magnetics;* those that are repelled are called *diamagnetics.* The former, when attracted, arrange themselves *axially*, that is in a line uniting the two poles, or passing through their axes. The latter, when repelled, arrange themselves in a line at right angles with the axial line, that is *equatorially.* Thus, if two bodies, the one *magnetic* and the other *diamagnetic*, be freely suspended over the poles of the magnet, with power to move in any direction, the former will take a position extending from pole to pole, in the *axial* direction; while the latter will take a position extending across the axial line, in the *equatorial* direction. These results were illustrated by suspending, in the magnetic field, by a silken thread, a roll of paper which is magnetic, and a small bar of metallic bismuth, which is diamagnetic, when it was shown that they arrange themselves in different directions. As already stated, it had been ascertained that all solids and liquids when brought within the influence of a powerful magnet, arrange themselves either *axially* or *equatorially;* but this had not, until recently, been proved to be the case with reference to flame and gases. The influence of magnetism on flame was first noticed by the Italian philosopher, Bancalari. He found that the flame of a candle placed in the magnetic field a little on one side of the axial line, was depressed and drawn out equatorially. This experiment, and others confirmatory of the result, had been repeated by Zantedeschi, and subsequently, with many amplifications, by the lecturer himself. The experiment performed with a large flame from a sponge wetted with ether was very striking. The flame, when placed in the magnetic field was split in two, being depressed immediately over the axial line, and rising on each side like two horns. A number of experiments were performed to show that the same effect was produced on gases. All gases, it was said, are diamagnetic, but not all equally so. Oxygen is the least diamagnetic of the gases, and nitrogen one of the most diamagnetic. In common with solid bodies, the gases are rendered more diamagnetic by increase of temperature, and *vice versa.*

The Professor confined himself to giving a representation of facts, without attempting any theoretical explanation of them.

NOTICES OF BOOKS.

PART II. OF ELEMENTS OF CHEMISTRY, *including the Application of the Science in the Arts.* By THOMAS GRAHAM, F.R.S., Corresponding Member of the Institute of France; Vice-President of the Royal Society, &c. &c. Second edition, entirely revised and greatly enlarged, with additional Wood Engravings. Baillière, Regent Street, London.

THE long looked-for Second Part of Professor Graham's work has at length appeared. It consists of 192 pages, making, with the part previously published, 352 pages. These comprise the sections on Physics applied to Chemistry, and on the principles of Chemical Philosophy. They contain a great deal of new matter—some entirely new sections; and present, in reference to the subjects treated of, a very excellent digest of the present state of the science. Among the articles in the part now under notice, those on *isomorphism*, *the constitution of salts* and *chemical polarity*, manifest much of the originality of

thought and perspicuity of expression, which characterise the author's writings.

There is a new chapter on *allatropy*, from which we take the following quotation: it will serve at once as a specimen of the work, and as an explanation of a term now frequently used by Chemists.

"A considerable variation of properties is often observable in a solid which is not crystalline, or of which the crystalline form is indeterminate. This fact has been designated *allatropy* by Berzelius (from ἀλλοτροπος, of a different nature): dimorphism, or diversity in crystalline form, is, therefore, a particular case of allatropy. Sulphide of mercury obtained by precipitating corrosive sublimate by hydrosulphuric acid, is black; but the same body, when sublimed by heat, or produced by agitating mercury in a solution of the persulphide of potassium, forms cinnabar, of which the powder is the red pigment vermilion; while vermilion itself, if heated till sulphur begins to sublime from it, and then suddenly thrown into cold water, becomes black; although, if allowed to cool slowly, it remains red. Yet it is of the same composition exactly in the black and red states." * * * * * * *

"The condition of *glass* is a remarkable modification of the solid form assumed by many bodies. Matter in this state is not crystallized, and on breaking, presents curved and not plain surfaces, or its fracture, in mineralogical language, is *conchoidal*, and not *sparry*. The indisposition to crystallize, which causes solidification in the form of glass, is more remarkable in some bodies, such as phosphoric and boraic acids, and their compounds, than in others. The biphosphate and binarseniate of soda have the closest resemblance in properties, yet when both are fused by a lamp, the first solidifies on cooling into a transparent colourless glass, and the second into a white opaque mass, composed of interlaced crystalline fibres. The phosphate at the same time discharges sensibly less heat than the arseniate in solidifying, retaining probably a portion of its heat of fluidity, or latent heat in a state of combination, while a glass. None of the compounds of silicic acid and a single base, such as soda or lime, or simple silicate, becomes a glass on cooling from a state of fusion, with the exception of the silicate of lead containing a great excess of oxide: they all crystallize. But a *mixture* of the same silicates, when fused, exhibits a peculiar viscosity or tenacity, appears to have lost the faculty of crystallizing, and constantly forms a glass. The varieties of glass in common use are all such mixtures of silicates. Glass is sometimes devitrified when kept soft by heat for a long time, owing to the separation of the silicates from each other, and their crystallization; and the less mixed glasses are known to be most liable to this change. It is probable that all bodies differ, when in the vitreous and in the crystalline form, in the proportion of combined heat which they possess, as has been observed of melted sugar (pages 45) in these two conditions.

"Arsenious acid, when fused or newly sublimed, appears as a transparent glass of a light yellow tint; but left to itself, it slowly becomes opaque and milk white, the change commencing at the surface and advancing to the centre, and often requiring years to complete it in a considerable mass. The arsenious acid is no longer vitreous, being changed into a multitude of little crystals, whence results its opacity; and it has altered slightly at the same time in density and insolubility. But the passage from the vitreous to the crystalline state may take place instantaneously, and give rise to an interesting phenomenon observed by H. Rose. The vitreous arsenious acid seems to dissolve in dilute and boiling hydrochloric acid without change, but the solution on cooling deposits crystals which are of the opaque acid, and a flash of light, which may be perceived in the dark,

is emitted in the formation of each crystal. This phenomenon depends upon and indicates the transition, for it does not occur when arsenious acid already opaque is substituted for vitreous acid, and dissolved and allowed to crystallize in the same manner.

"A still greater change than those described, is induced upon certain bodies by exposure to a high temperature, without any corresponding change in their composition. Several metallic peroxides, such as alumina, sesquioxide of chromium and binoxide of tin, cease to be soluble in acids after being heated to redness. The same is true of a variety of salts, such as many phosphates, tungstates, antimoniates, and silicates, Many of these bodies contain water in combination, when most readily dissolved by acids, which constituent is dissipated at a high temperature, but in general before the loss of solubility occurs, so that the contained water alone is not the cause of the solubility. Berzelius remarked an appearance often observable when such bodies are under the influence of heat, and in the act of passing from the soluble to the insoluble state. They suddenly glow or become luminous, rising in temperature above the containing vessel, from a discharge of heat. The rare mineral gadolinite, which is a silicate of yttria, affords a beautiful example of this change. When heated it appears to burn, emits light, and becomes yellow, but undergoes no change in weight. Fluorspar and many other crystalline substances, exhibit a feeble phosphoresence when heated, which has no relation to this change, and is to be distinguished from it.

"The circumstance most certain respecting this change in bodies, which affects so deeply their chemical properties, is that the bodies do not contain a quantity of heat, after the change, which they must have possessed before its occurrence in a combined or latent form. No ponderable constituent is lost, but there is this loss of heat. A change of arrangement of the particles, it is true, must occur at the same time in some of these bodies, such as is observed when sulphite of soda is converted by heat into a mixture of sulphate of soda and sulphuret of sodium, without change of weight; but it would be difficult to apply an explanation of this nature to oxides, such as alumina and binoxide of tin, which contain only two constituents, and still more so to an element such as carbon. The loss of heat observed will afford all the explanation necessary, if heat be admitted as a constituent of bodies equally essential as their ponderable elements. As the oxide of chromium possesses more combined heat when in the soluble than in the insoluble state, the first may justly be viewed as the higher *caloride*, and the body in question may have different proportions of this as well as of any other constituent. But it is to be regretted that our knowledge respecting heat as a constituent of bodies is extremely limited; the definite proportion in which it enters into ice and other solids in melting, and into steam and vapours, has been studied, and also the proportion emitted during the combustion of many bodies, which has likewise proved to be definite. But the influence which its addition or substraction may have on the chemical properties of a body is at present entirely matter of conjecture. The phenomena under consideration seem to require the admission of heat as a true constituent which can modify the properties of bodies very considerably; otherwise a great physical law must be abandoned, namely, that "no change of properties can occur without a change of composition." But if heat be once admitted as a chemical constituent of bodies, then a solution of the present difficulties may be looked for, for nothing is more certain than that "a change in composition will account for any change in properties." Heat thus combined in definite proportions with bodies, and viewed as a constituent, must not be confounded with the specific heat of the same bodies, or their capacity for sensible heat, which may have no relation to their combined heat."

CHEMICAL MANIPULATION AND ANALYSIS, QUALITATIVE AND QUANTITATIVE. By HENRY M. NOAD. Part I. (*Qualitative*), Nos. 1 to 4. London: R. Baldwin, Paternoster Row.

THIS work forms a part of the "New Series and Continuation" of the *Library of Useful Knowledge;* and is addressed to the general reader as well as to the Chemical Student. The author was originally commissioned to revise and extend Professor Daniell's Treatise on Chemistry, compiled some years ago for this publication; but in consequence of the great strides which Chemistry had made during the interval, he found it advisable to draw up a complete treatise, bringing the information down to the present time, and including chemical analysis, of which this is the commencement. The style of the work appears to be well adapted for the class of readers for whom it is intended. It is illustrated by numerous wood-cuts representing apparatus and the arrangements necessary for conducting Chemical operations. Tests and re-actions are perspicuously described, and the author has evidently taken much pains to convey information in a clear and familiar style, so as to be intelligible to those who have not the opportunity of attending lectures. As a Member of the College of Chemistry, and having been engaged in researches in the laboratory of that institution, he has had a good opportunity of embodying in the work all the modern improvements in chemical manipulation.

TO CORRESPONDENTS.

"*A Cambrian, A.P.S.*"—The crystals alluded to are most likely those of sulphuric acid with two equivalents of water ($S O_3 + 2 H O$). This acid, the second hydrate of sulphuric acid, has a specific gravity 1.780; it crystallizes when cooled to about 32°, and remains solid until heated to 45°.

"*Omega.*"—(1.) In effacing ink-stains with muriatic acid and chloride of soda, the two agents should be used separately, and in a very dilute state. See vol. vi., p. 217.—(2.) The complaints are unfounded.—(3.) We think the addition is an improvement.—(4.) We think the addition of valerian-root to compound decoction of sarsaparilla would not be an improvement.

H. A. S. (*Derby*).—(1.) We are not acquainted with any process for destroying the colouring matter of Gum Arabic, without altering its texture. —(2.) It is illegal for a Chemist to sell grains of Paradise, knowing or suspecting that the purchaser intends to use them for an illegal purpose. In the absence of any such knowledge or suspicion there is no prohibition.

G. (*Barking*).—The manufacture of gas is minutely described by Dr. Ure in his *Dictionary of Arts and Manufactures.* A detail of the particulars required would be too voluminous for insertion here.

J. S. (*Corsham*).—The best vehicle for pilula hydrarg. chloridi comp. is castor oil.

F.—We believe it to be impossible completely to deprive neat's-foot oil of its odour and impurities. Animal charcoal has been used with partial success.

"*An Old Member*" infers from the verdict in the trial Regina *v.* Bailey, that the defendant may henceforth manufacture spirit of nitre without paying duty or taking out a licence.—[This is not correct, the case having gone in favour of the defendant merely in consequence of a legal informality.]

"*A Chemist*" (*Bristol*).—In order to answer the question, it would be necessary to know the particulars of the case, and to consult a medical practitioner.

"*Dubius.*"—*First Lines for Chemists and Druggists* is a useful book for students preparing for examination.

"*A Constant Reader, G. S. S., M. P. S.*"—There is no restriction in the case alluded to.

"*A Poor Druggist.*"—Contributions and communications relating to the Benevolent Fund, may be addressed to the Secretary, Mr. Smith, 17, Bloomsbury Square.

"*Felix qui nihil expectat.*"—The communication has been received.

"*Vas pro scientia.*"—The following equation is given by Liebig in Turner's *Chemistry*, to represent the production of chloroform by the action of hypochlorite of lime on alcohol :—

2 atoms alcohol	$C_8\ H_{12}\ O_4$
8 " hypochlorite of lime	$O_{16}\ Cl_8\ Ca_8$
	$C_8\ H_{12}\ O_{20}\ Cl_8\ Ca_8$

Contain the elements of

1 atom chloroform.....	$C_2\ H\ \ \ Cl_3$
3 " formate of lime.....	$C_6\ H_3\ O_{12}\ \ Ca_3$
5 " chloride of calcium	$Cl_5\ Ca_5$
8 " water	$H_8\ O_8$
	$C_8\ H_{12}\ O_{20}\ Cl_8\ Ca_8$

"*Tyro Chemicus.*"—See Fownes's *Manual*, page 144.

"*Arthur, A. P. S.*"—(1.) Fresh Seville orange peel should be used in making the syrup.—(2.) *Spiritus Ætheris Sulphurici* is not ordered in the present London Pharmacopœia; but a formula was given for it in the Pharmacopœia of 1824; and the same formula is given in the present Edinburgh Pharmacopœia. It consists of one part ether and two parts rectified spirit.

"*A Student.*"—The presence of sulphate of magnesia in oxalic acid, may be detected by adding carbonate or phosphate of soda to the solution, which will give a precipitate, if magnesia be present.

Z.Z.Z., M.P.S.—Glass is now so cheap that there is little inducement for adopting the substitution mentioned, nor do we know of any substitute that has been found to answer equally well.

"*Questus.*"—Hoblyn's *Dictionary of Medical Terms.*

"*An Associate.*"—(1.) Preparation of extracts *in vacuo*, see vol. i., pages 28 and 154.—(2.) Spontaneous evaporation, see a paper by Mr. W. Hooper, vol. ii., page 638.—(3.) As an elementary work, it is one of the best published.

"*Juvenis, A.P.S.*"—(1.) Velno's Vegetable Syrup :

℞ Fresh Burdock root, sliced, ℥ij.
Dandelion root, ℥j.
Spearmint, ℥j.
Senna
Coriander
Liquorice, āā ℥iss.
Water, Oiss.

Boil to Oj, strain, and add

Sugar, ℔j.

Boil to make a syrup.—(2.) We have no formula for Webster's Diet Drink.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. VII.—No. XII.—JUNE 1st, 1848.

EVIDENCE RESPECTING PHARMACY BEFORE THE PARLIAMENTARY COMMITTEE.

The select Committee on Medical Registration and Medical Law Amendment have opposed the introduction of Pharmacy into their field of inquiry, on the plea that this addition to their labours would lead them into much perplexity and confusion, and thus delay the settlement of the affairs of the Medical Profession.

It has, nevertheless, been found impossible to avoid making allusion to the subject. As easily could Shylock have taken his pound of flesh without spilling a drop of blood, as could the Select Committee investigate the condition of the Medical Profession without trenching upon the subject of Pharmacy.

The portion of the evidence recently published justifies our expectations, and we quote a few extracts from it to show how fairly and impartially (?) an investigation of this kind may be carried on when two parties are concerned, and evidence is taken only on one side.

The following is a specimen of the evidence of John Ridout, Esq. :—

517. What is the precise distinction between an Apothecary, not so much considered in the light of a general practitioner, in which he often exercises his profession, but as a person keeping an apothecary's shop and dispensing medicine as a Chemist and Druggist ?—There is a very wide distinction : the Apothecary has, from the reign of Edward the Third, been a practitioner in medicine.

518. Are there not a great many persons who are qualified, as belonging to the Society of Apothecaries, to practise in medicine who do not practise, but who keep a warehouse or shop for dispensing drugs ?—I do not think there are any.

519. The Committee has heard frequently of an apothecary's shop in the course of the evidence which has been given before them ; the higher order of Apothecaries do not keep an apothecary's shop, do they ?—I think the public have suffered some injury in consequence of its being considered as an opprobrium to have an open shop. I think the general practitioner should, more frequently than at present is the case, have an open surgery, and that facilities should be afforded to the sick to obtain prompt medical assistance. In the absence of this facility, the sick are but too often almost of necessity compelled to seek for professional aid from Chemists and Druggists.

520. With respect to the importance of having the persons who officiate in any capacity as medical practitioners properly educated, what is the con-

trol which is now exercised over Chemists and Druggists, who have considerable power and responsibility in their hands, as regards their department of the profession ?—There is no control exercised over Chemists and Druggists of any kind that I am aware of : if they practise medicine they are subject to prosecution ; they do so in violation of the law ; but still it is said that there is a great deal of practice "over the counter," as it is called. I think that would be diminished, if the general practitioner, particularly in the early part of his professional career, kept an open surgery, and afforded facilities to the lower ranks of the community in obtaining the professional assistance which they need.

This evidence translated into plain English may be thus rendered :—The Chemists and Druggists are an inconvenient body of men—they take pence over the counter which the Apothecaries would like to have. The way to prevent Chemists and Druggists from acting as Apothecaries is for the Apothecaries to become Chemists and Druggists, and monopolize both functions.

523. Do you consider that it would tend in any great measure to the improvement of the medical profession to put some check upon the practice of a Chemist and Druggist, as well as upon the higher branches of the medical profession ?—I think the Chemist and Druggist, and every other person who has not given proof before a properly-qualified body that he is competent to deal with human life as a medical practitioner, should be prevented practising ; and it is said also, that the business of a Chemist and Druggist might be benefited by some controlling body exercising an influence over those who carry on that business ; but to that subject I have not paid much attention myself.

524. Do not you think it would be very desirable that a person, in order to exercise the profession of a Chemist and Druggist on a large scale, and to dispense medicine, should be required to undergo the general education which a person requires in order to be admitted into the Society of Apothecaries ?—His education should be of a different kind : he should be acquainted with pharmacy, chemistry, and materia medica, but he would not be required to have an acquaintance with anatomy, physiology, midwifery, or forensic medicine.

525. Are not you aware that there has existed among Chemists and Druggists themselves a considerable desire to have some preliminary education required before the right to practise is granted ?—It is generally the case throughout society, that persons who are practising honourably in any department of life, are very desirous of excluding those who are incompetent to the duties which they assume.

526. Were not there some meetings held, and some steps taken, in order to obtain some preliminary examination in the case of Chemists and Druggists ?—I believe so ; there has been a Pharmaceutical Society seeking for a charter of incorporation.

527. Do you think that that would be beneficial ?—I have not turned my attention to that subject, but I have no doubt that some control over the business of a Chemist and Druggist would be acceptable to the trade, and would be very beneficial to the public also.

529. The sort of education which is required for a Chemist and Druggist must of course qualify him to be able to understand medical language : is an ordinary tradesman practising as a Chemist and Druggist always understood to learn that—does he learn it as a branch of his own business merely, or is he not required to attend a little to the higher branches of the business, in order to qualify himself not to make mistakes in the more difficult prescriptions which may be presented to him ?—There has been

no examination instituted at all with relation to a Chemist and Druggist; his education has been obtained by him as well as he could obtain it from the person with whom he served his apprenticeship: mistakes have in consequence very frequently occurred, and physicians now very frequently write the directions for administering their medicines in English, instead of Latin, to prevent the mistakes which have been found to occur from the prescription being taken to a Chemist and Druggist, and wrong directions given for the use or application of the medicine prescribed.

530. Have the Chemists and Druggists any incorporation in any way?—No. Apothecaries formerly were in the habit of keeping open shops more generally than they now do, and persons were habitually seeking assistance from them; they had the business of Chemist and Druggist, and of Practitioner also; but in proportion as the Practitioner has become more scientifically educated, and practised as Practitioner exclusively, there has been a wider and wider separation between him and the Chemist and Druggist, till the Chemist and Druggist has become one branch of business, perfectly distinct from that of the general practitioner.

In charity to Mr. Ridout, we may be allowed to express a hope that he has a treacherous memory. It can scarcely be supposed that a gentleman of his respectable character would wilfully state falsehoods to deceive the Select Committee of the House of Commons. His assertions, however, are quite unaccountable. He states "that there has been no examination instituted at all with relation to Chemists and Druggists; and that they have no incorporation at all in any way." The Select Committee ought to be aware that both these assertions are untrue. The three examinations of the Pharmaceutical Society have been in operation for several years, namely, the CLASSICAL EXAMINATION for Apprentices, the MINOR EXAMINATION for Assistants, and the MAJOR EXAMINATION for Principals. These examinations were instituted expressly for CHEMISTS and DRUGGISTS by that body which was incorporated in February, 1843, by Royal Charter! So much for the *veracity* of Mr. Ridout!

As a sequel to the foregoing recommendation of an Apothecary to his brethren to start Chemists' shops, we find the following legal denunciation of those Chemists who presume to poach on the manor of the Apothecary. The witness in this case is Mr. Upton, the Solicitor of the Apothecaries' Company.

587. What do you hold to be the present state of the law with regard to the right of a Chemist and Druggist to prescribe over the counter in any medical cases which may come before him, to supply medicines and charge for them?—The law is perfectly clear; a Chemist and Druggist has no right to do anything but to sell medicines which are asked for. That defines, probably more than any other test, what the province of a Chemist and Druggist is. It is the same expression as was used by the College of Physicians in the reign of Queen Anne. The Physicians contended that the Apothecaries were to sell medicines asked for.

588. That was a case in 1701?—Yes; and Mr. Justice Cresswell has used that expression to define what a Chemist and Druggist's business is.

609. Have you, in any case, prosecuted a Chemist and Druggist for practising in his own shop?—No; but I should not hesitate to do so if I could

obtain evidence ; it is obvious that the mischief is the same ; it does not matter whether an uneducated person prescribes at the bedside or over the counter.

622. There is no case you say, in which a Chemist and Druggist has been prosecuted for practising as an Apothecary in his own shop ?—Not that I am aware of.

623. But you have no doubt that such a prosecution might be successfully instituted ?—That is my opinion, in point of law.

624. Both for the penalty and as a misdemeanor ?—In either form.

625. Will you state the course of proceeding in an indictment for misdemeanor ?—The ordinary course would be to prefer an indictment, setting out the crime in the mode which the practice of the criminal court requires ; the indictment would be preferred before the grand jury, and they would find either a true bill or no true bill ; if a true bill was found, the party would be put upon his trial, and would be tried, as in the case of any ordinary misdemeanor.

626. The same proof would be required as for the recovery of penalties ?—Just the same.

627. What is the cost of proceeding by indictment ?—Two cases only have taken place, one at the town of Bolton, where the defendant was tried before the borough sessions, and there the whole expense of the prosecution did not exceed £25 ; that was the first case that was tried.

The forgetfulness of one witness, seconded by the pugnacity of the other, may serve to enlighten our readers respecting the policy of those parties who are at this time in full feather before the Select Committee. It appears that the Chemist is to fall between two stools. He is to be restrained by summary indictments from any encroachment whatever — apparent or real—on the province of the Apothecary, while the Apothecary, dignified by the respectable title of General Practitioner, is to become a Chemist and Druggist, and carry everything before him in Pharmacy, as well as in Medicine, Surgery, and Midwifery.

Further comment at present is needless. We wait the appearance of the Bill, and in the mean time beg to direct the especial attention of our Members to the *animus* displayed in the evidence above quoted.

THE BENEVOLENT FUND DINNER.

This convivial and benevolent meeting appeared not only to give very general satisfaction, but greatly to exceed the expectations of its most sanguine promoters. The number of visitors was small, but the room was well filled with Members of the Pharmaceutical Society, who showed every disposition to "fraternise," and a unanimous desire to promote the object for which they had assembled. The harmony of the musical professors chimed in with that of the whole company, and those who had originally expressed the strongest aversion to public dinners were obliged to

acknowledge their error, and to confess that the direct road to an Englishman's heart is through his mouth.

The subscriptions were creditable both in number and amount, and it was satisfactory to observe the prominent part taken by the wholesale houses in the good cause. This liberality cannot fail to be appreciated by their retail brethren who constitute the bulk of the Society, and among whom, therefore, the chief demand upon the fund is to be apprehended.

It will be seen that the amount collected exceeds £700, the major part of which is from our members in London. As it is probable that many of our brethren in the country may desire to add their names, we intend to publish a supplementary list next month.

THE PUBLIC HEALTH BILL.

The sanitary condition of the people, especially in densely-populated cities and towns, has occupied so much of the attention of the Government and of scientific and benevolent men, that the ultimate success of these investigations has for some time past been almost a matter of certainty.

The Health of Towns' Bill was withdrawn last year, chiefly on account of the vigorous opposition of the Local Boards and Corporations, whose powers and authority in reference to sanitary regulations would, by that measure, have been transferred to Boards of Health, composed partly of nominees of the Government, and acting under the jurisdiction of the Secretary of State. This principle of centralization is not in accordance with the sentiments of the public in general in this country; and recent events in France, have tended to increase the objections to the undue preponderance of Government influence, especially in matters relating merely to local regulations. The most vigorous opposition to the original Bill was offered by the Corporation of the City of London and the several Metropolitan Vestries. Accordingly, a clause was introduced, exempting the Metropolis from the operation of the Bill, and other alterations were made with a view of conciliating those who were opposed to the measure, but without success.

The Bill now before the House was also opposed by the Metropolitan Boards, and the exemption was introduced accordingly, with the understanding that a separate Bill would be introduced with reference to the Metropolis. This latter has not yet appeared; but its objects being the same, and its importance as great as those of the present Bill, there is reason to believe that the dif-

ference will consist rather in the mode of administration than in the abstract principles of the Bill.

The Bill before us is voluminous, consisting of 151 clauses, and comprising among its objects the appointment of a general board of health, and local boards, with surveyors, inspectors, and other officers—the regulation of sewers and drains, privies, surface cleansing, nuisances, slaughter-houses, ventilation, lodging-houses, public pleasure-grounds, the supply of water, reception-houses for the dead, burial-grounds, the purchase of land and houses for public improvements, the general superintendence of local boards, with such provisions as are requisite for carrying on the machinery of the Act.

The measure in its present form is free from most of those defects which existed in the Bill of last year, and is calculated to effect a great improvement in the sanitary condition of the people. It is obvious that a sanitary law, if required at all, is more necessary in proportion to the density of the population, consequently its advantage would be at the maximum in the Metropolis, where the evils, which it is intended to remove, exist to the greatest extent. The corporations and vestries in the metropolis are not opposed to the general principles and objects of the Bill, but they demand the exercise of their right to be the instruments for carrying out its provisions; and we are persuaded that local government in such matters, subject to the general supervision of the proposed Board of Health, would be more likely to give satisfaction to the public than the centralization of the powers of the Act in the Government of the country, or its nominees. In this as in most other cases, some concessions must be made on both sides, otherwise the substance will be lost from the determination to grasp at the shadow.

Local Boards are not infallible; they are liable to abuses, arising from neglect of duty, jobbing, and the intrigues of individuals. They must submit to the general supervision of a Central Board, free from local prejudices and influenced by the responsibility of maintaining one grand principle of action throughout the country for the benefit of the public.

But such a Central Board is not calculated or qualified to be the executive in carrying out the details of a measure of this description. These can only be satisfactorily conducted by persons possessing local knowledge and experience, and acting as the representatives of the parties immediately concerned, responsible in the first instance to their fellow parishioners, in the performance of their official duties; and, secondly, to the Government as the head of all institutions in the country.

We quote the following clauses which relate to a very important branch of the subject, on which the law is at present so

ambiguous, or imperfectly understood, that it is in many instances inoperative.

"47. And be it enacted, that it shall be the duty of the Local Board of Health to drain, cleanse, cover, or fill up, or to cause to be drained, cleansed, covered, or filled up, all ponds, pools, open ditches, drains and places containing or used for the collection of any drainage, filth, water, matter, or thing of an offensive nature, or likely to be prejudicial to health; and they shall cause written notice to be given to the person causing any such nuisance, or to the owner or occupier of any premises whereon the same exists, requiring him, within a time to be specified in such notice, to drain, cleanse, cover, or fill up any such pond, pool, ditch, drain, or place, or to construct a proper sewer or drain for the discharge thereof, as the case may require; and if the person to whom such notice is given fails to comply therewith, the said Local Board shall execute the works mentioned or referred to therein, and the expenses incurred by them in so doing shall be recoverable by them from him in a summary manner, or be deemed to be private improvement expenses, and be recoverable as such in the manner hereinafter provided: Provided always, That it shall be lawful for the said Local Board to order that a portion of the expenses incurred in respect of any such last-mentioned works be defrayed out of the Special or General District Rates to be levied under this Act, and in case of any such order, the whole or such portion of the expenses as may be mentioned therein shall be defrayed and levied accordingly.

"49. And be it enacted, That if upon the certificate of the officer of health, (if any), or of any two medical practitioners, it appear to the Local Board of Health that any house or part thereof is in such a filthy or unwholesome condition that the health of any person is affected or endangered thereby, or that the whitewashing, cleansing, or purifying of any house or part thereof, would tend to prevent or check infectious or contagious disease, the said Local Board shall give notice in writing to the owner or occupier of such house, or part thereof, to whitewash, cleanse, or purify the same, as the case may require; and if the person to whom notice is so given fails to comply therewith within such time as shall be specified in the said notice, he shall be liable to a penalty not exceeding ten shillings for every day during which he continues to make default; and it shall be lawful for the said Local Board to cause such house, building, or part thereof, to be whitewashed, cleansed, or purified, and the expenses incurred by them in so doing shall be repaid by the owner or occupier in default, and be recoverable from either of them in the summary manner hereinafter provided."

In the investigation of nuisances of the above description, the services of Medical Practitioners and Chemists will be called into requisition, and there is an ample field for enterprize in many localities, where accumulations of filth, and crowded unwholesome tenements are fertile sources of discomfort and disease. We intend to resume this subject next month.

SEVENTH ANNIVERSARY
OF
THE PHARMACEUTICAL SOCIETY,

Held at 17, *Bloomsbury Square, May* 16*th*, 1848.

Mr. JOHN SAVORY, President, in the Chair.

THE PRESIDENT, in opening the Meeting, delivered the following Address:—

AT our last Anniversary Meeting, GENTLEMEN, I had the honour of directing your attention to the history of our Society, which has, within the last seven years, sprung into a state of vigour such as to ensure its future flourishing and ripened condition. It would be useless for me again to advert to the early progress of this now powerful association, or to set forth the advantages to be derived from it by our younger and more aspiring Pupils and Associates, many of whom are profiting by the course of instruction provided by the Society in the Lecture-room and Laboratory of the Institution.

I would most strenuously urge upon the youth amongst us, that, whilst time and opportunity permit, they should avail themselves of these advantages, and lay up such a store of knowledge as shall render them qualified for the duties they are about to enter upon. In so doing, they are but laying the foundation of future happiness and prosperity, for, while knowledge, rightly applied, contributes to worldly advancement, nothing can exceed the misery of an ignorant old age. As old age is not only a collection of diseases, but even a disease of itself, and by the decree which Providence hath passed upon man, incurable, save by death, the best thing, next to a remedy, is a diversion, or an abatement of the malady. The cold Corelian cannot change his clime, but yet, by furs and fires, he can preserve himself in a boisterous and icy winter. The drum and fife can sometimes drown the battle's noise when there is no way to escape it. And what can so well support man under the decay and infirmities of age as *knowledge*, *study*, and *meditation?* With this a man can feast at home, alone, and in his closet; putting himself into whatever company shall best please him. Study will relieve the tediousness of decrepid old age; and contemplation will beguile the weariness of the pillow and the chair. He that can read and meditate need not think the evening long or life irksome: it is,

at all times, a fit employment, and a solace to him who is bowed down with years. Without this an old man is but the shadow of that which once he was. Ignorant old age is the worst picture that time can draw of man. If study were valuable for nothing else, yet it would be highly so for this, that it makes a man his own companion, without either the charge or the cumber of company. He is neither obliged to humour nor to flatter: he may hear his author speak as far as he likes, and leave him when he does not please him; nor will he be angry though he be not of his opinion. The answer was good which Antisthines gave when he was asked what fruit he had reaped of all his studies? "By them," said he "I have learned both to live and discourse with myself." When, gentlemen, I think how important a position is held by the Chemist, and how useful a member of society he is designed to be, I turn with sorrow to look upon those with whom the name is in many parts of the country associated. At present, as the law stands, any man, however ignorant—an individual unable even to sign his own name—half of whose shop is stored with butter, bacon, cheese, or tape, shall from the other half have the power of dispensing, to any person applying, preparations of *mercury*, *arsenic*, *opium*, &c. &c. The disclosures made before the Committee of the Houses of Parliament relative to the indiscriminate sale of what is called *infant's quietness*, one would think would be sufficient to arouse the attention of the legislature, and to call forth the remedy, for the only effectual remedy is in the hands of Government. In France, in Germany, in Russia, in Prussia, and indeed in nearly every other civilized part of the world, an examination *must* be undergone, and a diploma obtained, ere an individual can dispense or vend a single drug, and even then he is allowed to do so only under certain restrictions. I, for one, in common with many of you, would regret to find similar restrictions imposed upon the Chemists of this country; but let us, nevertheless, persevere in endeavouring to obtain such an Act of Parliament as shall afford to the medical profession and the public, a better security than they have at present for the proper exercise of the important duties which devolve upon those to whom is entrusted the preparation and the sale of medicines.

While the application of remedies for the cure of disease is left to the Physician, no small amount of assistance is often rendered by the qualified Chemist, in producing or suggesting new and valuable agents, which are thus added to the Materia Medica.

At our last Anniversary Meeting I alluded to the use of the vapour of sulphuric ether as an anæsthetic agent, but since then chloroform has almost entirely superseded ether, and much

practical skill and ingenuity have been exercised in the endeavour to produce this valuable agent in the greatest state of purity, and at the smallest cost. Chloroform appears to be more powerful in its effects than ether, and some doubts have been entertained as to whether its administration is not attended with more danger; but considering how very extensively it has been used throughout the country, and in most cases by persons inexperienced in its administration, it is extraordinary that so few accidents have occurred.

The sphere of the Chemists' exertions is not confined to the preparation of medicinal agents; there is a wide field for the exercise of his talents in the examination of the productions of nature, and their application to the arts. Observe, for instance, what extensive application has been made within the last few years of the substance called *gutta percha*, the sap of a tree which grows abundantly in the island of Singapore, and which Sir William Hooker has named *Isonandra gutta*. Mr. Brooke states, that this tree is called *Niato* by the Sarawak people: that it grows to a considerable size, the trunk acquiring a diameter of six feet: that the timber is not fit for building, being too loose and open; but that the fruit yields a concrete oil, which is used as food. He further states, that the natives are not acquainted with the properties of the sap. Since the introduction of *gutta percha* into this country, it has been applied in the construction of straps for machinery and for harness, of ribbon, cloth, shoes, surgical instruments, and even the special constable's baton.

It has many very curious properties. Below the temperature of 50° it is as hard as wood, but it will soon receive an indentation from the finger-nail. When softened in hot water, it may easily be cut and moulded; and it will harden as it cools to its former rigidity, and it may be softened and hardened any number of times without injury to the material. Unlike caoutchouc it has little elasticity; but it has such tenacity that a slip one-eighth of an inch in thickness sustained forty-two pounds weight, and only broke with a pressure of fifty-six pounds. When drawn out it remains without contracting. It has been suggested that the gutta percha would be found useful in stopping decayed teeth.

At our last Anniversary I alluded to the importance of the efforts made by Chemists for effecting the destruction of malaria. Public attention, and a small share of legislative attention have been during the past year bestowed upon this subject; but notwithstanding all efforts at improving the salubrity of the air, the mortality has far exceeded that of former years. In London alone it is calculated that upwards of 13,000 lives are sacrificed

annually for want of proper sanitary regulations, as the rate of mortality in London exceeds that of the surrounding neighbourhood by this number. It appears that attention should be directed not so much to the deodorizing as to the disinfection of malaria. Sad and melancholy results have occurred within the last few days, owing to the neglect of this consideration. A venerable and learned prelate, well known in the scientific world, has had drains opened and a fluid poured into various cesspools for the purpose of disinfecting their contents; but unfortunately the *odour* only and not the malaria has been destroyed, and he himself and some members of his family are now suffering from fever. Death has resulted in several instances in the immediate neighbourhood from the same cause.

Whilst urging the importance of education, and pointing out some of the advantages resulting from the application of scientific knowledge, it may not be amiss to glance for a moment at the effects of ignorance of which we have a good illustration in the continued influence of Quackery. Southey has said that "Man is a dupeable animal. Quacks in medicine, quacks in religion, and quacks in politics know this, and act upon that knowledge." At the present time in Germany *Isopathy* is as much practised and vaunted as Homœopathy or Hydropathy were at their birth. This system, founded by a Dr. Herman, derives its name from the doctrine that the disease of any organ is to be cured medicinally by the use of the analogous organ of some healthy animal. Thus in diseases of the liver, *liver* is prescribed; of the brain, *brains;* and the same plan is pursued with the kidney, spleen, and other viscera. The form of administration is that of tincture, and thus concentrated essences are exhibited.

I am unwilling to trespass upon your time by any lengthened remarks. The Report will be read to you by the Secretary, detailing the state of our affairs, and will receive your consideration as it merits. It will be your duty also to elect Members of Council for the ensuing year; and, whilst speaking of the Council, I cannot but allude to the valuable assistance we have received by the co-operation of several of our Provincial Brethren. It is with much pain and regret I refer to the loss we have sustained by the death of one of them, Mr. Terry, of Bath. This gentleman, notwithstanding his distant residence, was most constant in his attendance at our Board, zealous in our cause, and of a benevolent mind. He was much respected during his life, and the memory of him is cherished by a large circle of friends.

This evening, gentlemen, we are to meet at the festive board, not merely, I trust, for our own selfish gratification, but with the view of stimulating our best and kindest feelings, and enlisting

them in the consummation of a work which we commenced seven years ago for the benefit of our distressed brethren. The hour of adversity may visit any one of us. The unsparing hand of death may deprive our families of their only means of support, and this perchance at the very moment when the sunshine of prosperity has began to dawn upon their career. There is an uncontrollable feeling of desolation and wretchedness associated with the name of Widow or Orphan, which no words can describe, and although it would be impious to call in question the secret operations of the Deity, for I have no doubt that whatever happens, however painful it may be to our feelings, is intended to fulfil some great and inscrutable purpose, yet it is no less our duty to alleviate distress, and to succour the friendless and the destitute.

At the festive board at which you are to assemble, I feel confident, from the exertions the Stewards have made for your comfort, you will be entertained with every thing that can gratify your taste, sight, and hearing; but in the midst of so much enjoyment we must not forget our poorer brethren, for you must remember that those enjoyments cannot last for ever, and that some of us may, in declining years, require an asylum, or pecuniary assistance. The very youngest of us, after a few passing years, decline into old age, and none of us, I again repeat, can tell how long it may be before we are afflicted, through the dispensation of Providence, by *sickness* or *poverty*, and if that day should come, what must be the feelings of that man, who, in the heyday of his youth or prosperity, has neglected to contribute to institutions like the one you have so laudably established? It is, gentlemen, to avert such feelings, and to provide for the needy, that you are about to assemble this evening, and I hope that ere midnight we shall have insured the establishment of a fund that shall gladden the hearts and cheer the desolate homes of the destitute, the widow, and the fatherless.

The PRESIDENT then called upon the Secretary to read the Annual Report.

THE REPORT.

THE Council trust that the Seventh Annual Report, which they now present, will give satisfaction to the Members at large, and prove that the great and important objects for which this Society was established have been progressively carried out. The Auditors' Account shows, that the financial state of the Society is favourable, and the funded capital increased. The number of Members remains about the same. The Associates have diminished

in number, many of them having become Members, and their ranks being less rapidly filled up in consequence of the examinations, which are now compulsory on all fresh candidates for admission. Judging from the increase of registered Apprentices, there is no reason to regret this temporary difficulty in gaining admission, as it will eventually lead to the best results, by furnishing a stimulus to improved education—one of the most important objects of the Society.

FINANCIAL REPORT.

RECEIPTS AND EXPENDITURE FROM JAN. 1st. TO DEC. 31st, 1847.

Dr.

	£	s.	d.
Life Members Subscriptions 31 10 0			
Interest..... 19 11 8			
	51	1	8
Benevolent Fund Subscriptions 75 5 0			
Interest..... 65 17 6			
	141	2	6
Druggists' Old Fund, Interest	48	1	7
Government Securities, Interest.....	141	19	9
352 London Members	554	8	0
1277 Country Members	1340	17	0
Entrance Fees	59	8	0
866 Associates	454	13	0
274 Registered Apprentices ...	143	17	0
Registration Fees	20	15	6
Subscriptions for 1846	46	4	0
Lecture Fees	141	15	0
Balance due to Treasurer	312	9	0
	£3447	12	0

Cr.

	£	s.	d.
Balance due to Treasurer	299	2	9
Investment—Life Members' Fund	39	11	10
Investment—Benevolent Fund	216	10	8
Investment—Druggists' Old Fund.....	31	13	4
Museum	24	4	6
Postage.....	29	7	3
Delivery of Journals	151	10	0
Stationery	13	0	4
Advertisements	19	12	6
Salaries.....	305	0	0
Wages	133	17	0
Journals	675	0	0
Printing.....	39	3	0
Commission.....	53	6	2
Law Costs	8	12	6
House Expenses	85	11	8
Sundries.....	2	7	11
Lectures	614	11	0
Laboratory	254	16	3
Library	29	3	6
Travelling Expenses.....	54	6	6
Rent, Rates, and Taxes	367	3	4
	£3447	12	0

WE, the undersigned Auditors, have examined the Accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement; and that there was standing in the names of the Trustees of the Society at the Bank of England, on the 31st of December, 1847,

		£	s.	d.
On Account of the General Fund	3¼ per Cent. Reduced	3000	0	0
Benevolent Fund.....	3 per Cent. Consols...	2510	7	9
Druggists' Old Fund, New	3¼ per Cents....	1036	7	1
Life Members' Fund,	3 per Cent. Consols	717	19	9

WILLIAM JACKSON.
B. R. C. ROUSE.
ALEX. HEMINGWAY.
RICHARD KELLAND.
H. E. M. TAYLOR.

17*th April*, 1848.

THE SCHOOL OF PHARMACY.

In reviewing the proceedings of preceding years, the Society may take credit for having established, for the first time in England, a practical School of Pharmacy, and Chemistry applied to Pharmacy, and for having placed within the reach of Students the means of acquiring proficiency in every branch of knowledge requisite to enable them to follow their profession with credit to themselves and safety to the public. This School is now in active operation, and the reports of the Teachers, and the Board of Examiners, afford satisfactory evidence that it contributes not only to the benefit of the pupils, but also of the Society, which is thus strengthened by the accession of proficient Members.

The establishment and early operations of the School have necessarily been attended with much expense to the Society, especially as it was deemed desirable, in the first instance, to encourage the attendance of pupils by making the fees so low that they have amounted to much less than the current expenditure. The attention of the Council has been directed to this subject, and a reduction in the expenses of the Lectures and Laboratory has taken place, without diminishing the practical utility of these important branches of the operations of the Society. Professor Fownes having been obliged, on account of the state of his health, to discontinue his lectures, it was considered advisable, instead of appointing another Chemical Professor in his place, to amalgamate the Chemical with the Pharmaceutical Lectures, which extended course was undertaken at the request of the Council by Mr. Redwood. A further advantage has been gained during the past year by the liberality of the Professors, who seconded the endeavours of the Council in the way of retrenchment by making a considerable reduction in the terms on which they delivered the lectures.

There has been an improvement, during the present season, in the attendance of pupils in the Laboratory, the average periods of pupilage having been longer than was the case last year. The accommodation at the disposal of the Professor has been barely sufficient for the numerous class who have actively pursued and are still pursuing their studies, both in the Laboratory which is devoted to the ordinary synthetical processes connected with the preparation of medicines and chemical compounds, and in that which is set apart for the more delicate operations of analysis. The alterations which were made last year for improving the accommodation of the analytical department have been found to be efficient, and the arrangements are altogether such as to afford every requisite facility for the study of Chemistry and Pharmacy.

Among the pupils who have attended this course, there are many who have had no other available means for acquiring the requisite knowledge to enable them to gain admission into the Society by examination. It is also gratifying to find that some have come from distant countries, and one of these, an intelligent African, is probably the first native of that soil who will apply a knowledge of Chemistry acquired in an English school, with the view of promoting the arts of civilization among his coloured brethren.

THE MUSEUM AND LIBRARY.

It will be the duty of the New Council to direct attention to the Museum and Library. Many valuable specimens have been presented to the Society, for the efficient exhibition of which there is, at present, no suitable accommodation. The addition of some works of reference to the Library will also be desirable.

THE PHARMACEUTICAL MEETINGS.

The Council regret that these Meetings have not been supported with so much spirit during the past year as was the case in former years. The Society has, since the establishment of these meetings, been favoured with many interesting communications, not only from some of its own members, but also from scientific men whose names have given increased weight to the proceedings, and from whom further favours may be expected if the members generally will perform their part in supporting the meetings. The Council propose in future to announce, on the cover of the *Pharmaceutical Journal* before each meeting, the subjects which are to come forward for discussion, whenever this may be found practicable, and they also anticipate an arrangement for evening lectures, which may prove instructive and interesting with small cost to the Society.

THE BENEVOLENT FUND.

The Council beg to refer the Members to the regulations recently adopted for the distribution of the Benevolent Fund, and published in the *Pharmaceutical Journal*, vol. vii, pages 207, 355, and 510. In anticipation of the Benevolent Fund Dinner, which is to take place at the close of the Anniversary Meeting, it is unnecessary to enlarge on the subject in the Report.

THE MEDICINE STAMP ACT.

Among other subjects which have claimed the attention of the Council during the past year, may be mentioned the informations which have been laid against some Members of the Society, both in town and country, for selling medicines without stamps, which, on enquiry, were found to be liable to duty. Immediately on the receipt of communications from the parties informed against, application was made to the authorities at Somerset House, and

the result of the information there received was published in the *Pharmaceutical Journal* (vol. vii.. p. 361) in order that all the Members of the Society might become acquainted with the exact meaning of the terms of the Act, and thus escape future annoyance.

In most cases the penalties were mitigated to £1 or £2, in others they were remitted altogether, according to the circumstances of each case as represented to the authorities.

The Council take this opportunity of observing, that while it is their duty to advocate on all occasions obedience to the spirit and letter of the law, it is also their desire to use all their endeavours for the protection of Members who may have unconsciously incurred responsibility, in cases of the above description, for want of a clear understanding of the precise meaning of the Acts of Parliament.

THE PHARMACEUTICAL BILL.

During the political excitement which has for some time past prevailed, it was scarcely to be expected that the questions of Medical and Pharmaceutical Reform, would obtain much attention on the part of the Legislature. Accordingly, the Council have to express their regret that their endeavours have not yet been attended with a successful result.

The Committee of the House of Commons, which is now inquiring into the state of the Medical Profession, has made some progress, and has under consideration the outline of a plan which it is proposed to adopt as the basis of an Act of Parliament. The Council have been repeatedly assured by the Secretary of State, and also by those other Members of the Legislature who are engaged on the subject, that as soon as a Bill has been completed for the Medical profession, the arrangement of the Pharmaceutical department will follow as a matter of course. Sir De Lacy Evans has given notice of a motion in the House of Commons to the effect that the whole subject, including Pharmacy, shall be investigated by the Committee of the House now sitting.

The Council have observed with some regret, the unwillingness of the Committee to entertain this branch of the subject as a part of their official duties; while evidence respecting Chemists and Druggists has been obtained from some of the witnesses connected with the Apothecaries' Company. It will be the duty of the new Council to watch narrowly the proceedings of the Committee in the House, and to give due notice to the Members at large, in the event of any measure being introduced founded on *ex-parte* statements, and prejudicial to the Pharmaceutical body.

Mr. Barkley, in moving the adoption of the Report, desired some explanation respecting the apparently slow progress the Council had made in the most important part of their labours, namely, the Pharmaceutical Bill. Although he did not himself charge the Council

with apathy and inattention to their duties, he thought it right to mention that he had heard Members in his neighbourhood express much dissatisfaction on the subject. Some declared they would not continue to support a Society which had been for six years or more holding out expectations of a Bill being passed, which, however, was discussed year after year, while no progress appeared to be made. Other Chemists declined to join the Society because they despaired of any success in the undertaking. He (Mr. Barkley) thought it right to draw attention to the subject, in order to give the Council an opportunity of giving an explanation. He moved,

"That the Report now read be adopted, and be printed in the Transactions of the Society."

Mr. Ralph Stamper seconded the motion.

Mr. Waugh observed that the parties alluded to by Mr. Barkley had no right to complain, for they admitted that the Pharmaceutical Society was the body from whose exertions they might calculate on obtaining an Act of Parliament, and yet they declined to support the Society because it had not done that which could only be achieved by means of the united support of its Members. If they really desired to see the object attained, they should unite in the undertaking instead of finding fault with those who had been labourers in the cause for several years, and who had used their best endeavours to promote the welfare of their brethren.

Mr. Jacob Bell thought it might be as well for him to give some explanation of the obstacles which had impeded the progress of the Pharmaceutical Bill. Mr. Warburton, who had originally been the champion, and had undertaken to bring forward the measure in the House, had left Parliament, and although many of the present Members, had expressed a warm interest in the subject, no one had hitherto been found to supply the place of Mr. Warburton, whose experience in medical affairs gave him so great an advantage. Sir De Lacy Evans had made several attempts to obtain the introduction of Pharmacy into the official inquiries of the Medical Registration Committee, but the Committee opposed the motion as a formidable addition to their labours. Consequently, the only evidence in the possession of the Committee, with reference to Chemists and Druggists, was obtained from Apothecaries, who being ignorant of the facts, were not likely to give an accurate account. (Mr. Bell mentioned a few specimens of erroneous statements in the published evidence, see page 553.) With such evidence as this to guide them in forming an opinion, it was not likely that the Committee would be favourably disposed towards Chemists and Druggists, and the endeavours on the part of the Council to bring the subject of Pharmacy fairly before the House had hitherto been unsuccessful. But it must not be supposed that the Council had been inactive. They had several times memorialized the Secretary of State—they had attended at the Home Office, and on many occasions had held communication with Members of Parliament, but they had invariably been met with the answer that the medical part of the question must be settled first. Now, this being the determination of the Legislature, it was not at all improbable that the Bill resulting from the present Committee, being founded on *exparte*

evidence, might contain clauses which would demand the close attention of the Pharmaceutical body, and in case it should be requisite to appeal to the Members at large on the subject, the Council would rely on the energy and zeal which the Society had always displayed on similar occasions. The chief labour would rest as before, on the Council, who looked to the Members at large for support whenever a general appeal to Parliament was found requisite. Some of the Members appeared to imagine that an Act of Parliament was very easily obtained. Experience had shown that it was attended with more difficulty than had in the first instance been anticipated, and it was only by steady perseverance and determination that success could be expected.

The Motion was put and carried.

It was then *moved by* Mr. Luckombe; *seconded by* Mr. R. H. Pigeon, Jun., and *resolved*,

"That the cordial Thanks of this meeting be given to the Council for their services during the past year."

The next business of the meeting consisted in electing Members of Council and Auditors for the ensuing year.

The Chairman read the list of candidates for election. He stated that eighteen candidates were proposed as Members of Council, fourteen of whom were to be elected.

The following Members were appointed Scrutineers by the meeting, to examine the ballotting papers and report the result, viz.,

Messrs. Hulse, Deane, Simkin, and Humpage.

The Chairman subsequently announced the result of the election, and declared the following Members of the Society to constitute the Council and Auditors for the next twelve months.

The following continue Members of the Council by Lot, agreeably with the provisions of the Charter:—

Edwards, George, Spital Street, Dartford
Gifford, Joseph, 104, Strand
Hooper, William, 24, Great Russell Street, Covent Garden
Ince, William, 31, Southampton Street, Strand
Pedler, George, 199, Fleet Street
Standring, Thomas, 1, Piccadilly, Manchester
Tosswill, Charles Speare, 8, Torrington Place, Torrington Sq.

The following were elected Members of the Council for the next year:—

Bartlett, William, 1, Brettin Terrace, Chelsea
Bell, Jacob, 338, Oxford Street
Bird, William, Lionel, 42, Castle Street, Oxford Market
Garle, John, 12, Kensington Terrace, Gravel Pits
Glaisyer, Thomas, 12, North Street, Brighton
Hanbury, Daniel B., Plough Ct.
Herring, Thomas, 40, Aldersgate Street
Morson, Thomas, N. R., 19, Southampton Row
Palk, John, 82, St. Sidwell's St., Exeter.
Pigeon, Richard Hotham, 31, Throgmorton Street
Savory, John, 143, Bond Street
Squire, Peter, 277, Oxford Street
Ward, John, 79, Bishopsgate Street
Waugh, George, 177, Regent Street

The following were elected as Auditors:—

HEMINGWAY, ALEXANDER, 28, Portman Street
JACKSON, WILLIAM, 93, Cheapside
KELLAND, RICHARD, 21, Nelson Street, Greenwich
ROUSE, BENJAMIN, R.C., 9, Wellington Street, Southwark
TAYLOR, HENRY, 10, Pall Mall

DISTRIBUTION OF PRIZES TO THE SUCCESSFUL COMPETITORS IN THE CLASS OF MATERIA MEDICA.

The Council having decided that the distribution of prizes which had been awarded in the class of Materia Medica, should take place at the Anniversary Meeting, the Chairman called on Dr. Pereira to report the result of the examination.

Dr. Pereira said he had much pleasure in giving a satisfactory report of the class which had attended the lectures on Materia Medica. A larger number of competitors than usual had presented themselves at the examination, and he could assure the meeting that those to whom he had awarded the prizes and honorary certificates, had most amply merited them. The questions he had drawn up were of a very searching character, and the answers indicated a high degree of proficiency on the part of the pupils, and especially of those to whom the prizes had been awarded. In fact, he had observed throughout the course, that there were a large number of intelligent and well-informed young men among the pupils, whose attention, zeal, and general good conduct, were highly commendable. It must, he thought, be satisfactory to the Society to find, after the heavy expense which had been incurred in establishing a system of education for the rising generation of Chemist and Druggists, that it was the means of developing the talents of so many young men who would reflect credit and honour on the body to which they belonged.

The following are the questions which had been submitted to the competitors:—

1. Enumerate the chief officinal articles of the Materia Medica obtained from invertebrated animals, referring each to its proper class and order. State the principal characteristics of each class.
2. Enumerate the chief officinal articles of the Materia Medica obtained from flowerless plants, referring each to its proper natural order. State the principal characteristics and prevailing chemical and medicinal qualities of each order.
3. Describe the botanical characters and medicinal qualities of, and enumerate the officinal substances yielded by, the following natural orders: *Zingiberaceæ*, *Coniferæ*, *Piperaceæ*, *Euphorbiaceæ*, and *Rubiaceæ*.
4. Mention examples of medicinal bulbs, cormi, rhizomes, arils, seeds both albuminous (ruminated and non-ruminated) and exalbuminous, fruits falsely called seeds, tuberose roots and tubers.
5. Describe the method of detecting the following adulterations and intermixtures:
   a. Ground lignum vitæ with powdered jalap.
   b. Potato sugar with cane sugar.
   c. Dextrine with gum arabic.

d. Boxwood chips with quassia chips.
e. White mustard meal with black mustard meal.
f. Salicine with disulphate of quina.
g. Disulphate of cinchonia with disulphate of quina.
h. Argol leaves with real senna leaves.
i. Turmeric powder with rhubarb powder.
k. Cassia lignea with cinnamon.
l. English rhubarb with Russian rhubarb.

6. How would you distinguish
   a. French oil of turpentine from the English oil. Is the sample marked A, French or English oil ?
   b. Tous les mois starch from potato starch.
   c. Jamaica and Lima sarsas from Honduras and Brazilian sarsas.
   d. Tannic from gallic acid.
   e. Morphia from codeia.
   f. Meconic from sulphocyanic acid.
   g. Botany Bay resin (*Xanthorrhœa hastilis*) from gamboge.
   h. Commercial camphor from artificial camphor and from Borneo camphor.
7. Give the chemical formulæ for
   a. Cinchonia and quina.
   b. Morphia and codeia.
   c. The volatile oils of the genus *Allium* and of the natural order *Cruciferæ*.
8. Describe the manufacture of disulphate of quina ; of cod-liver oil ; and of elaterium.
9. Name the substances respectively marked 1, 2, 3, 4, 5, and 6.

The prizes and honorary certificates were awarded as follows :—

LECTURE PUPIL.

PRIZE .....Mr. William Copney, at Mr. Hawxby's, 37, Berner's-st.

LABORATORY PUPILS.

FIRST PRIZE.....Mr. R. W. Giles, of Clifton.
SECOND PRIZE .....Mr. J. C. Braithwaite, of Bartonsham House, Hereford.

CERTIFICATES OF MERIT.—1. Mr. H. D. Pochin.
2. Mr. R. S. Starkie, 4, Strand.
3. Mr. R. H. Harrison.

The Chairman, in presenting the prizes and honorary certificates, congratulated those who received them on the successful result of their studies, and expressed the satisfaction it had afforded him to hear so favourable an account not only of those who had thus publicly distinguished themselves, but of the pupils generally in the school.

The business of the meeting being now concluded,

Mr. HUMPAGE moved, and Mr. SIMKIN seconded, a vote of thanks to the Chairman, which he briefly acknowledged.

THE DINNER FOR THE BENEFIT OF THE BENEVOLENT FUND OF THE PHARMACEUTICAL SOCIETY.

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

This festival took place at the time appointed, the 16th of May, at the Albion, in Aldersgate Street.

The musical arrangements were under the direction of Mr. Grattan Cooke, assisted by Messrs. Hatton, Hobbs, Francis, and the Misses Williams.

On the removal of the cloth, "*Non nobis Domine*" was sung by the vocalists present.

The Chairman then stated that he begged the company to consider him as the representative of his old and valued friend, Mr. Savory, who had just written to request that he would act in his place at the Dinner, as he (Mr. S.) was too unwell after the morning's exertions to admit of his presiding at the table on the present occasion.

The Chairman proceeded to propose the first toast, "The health of Her Majesty the Queen;" which he prefaced by stating that at the present time, when all Europe was in a state of active fermentation, when old forms of government and institutions, were destroyed before new and better ones were prepared to replace them—he would call on those who felt the advantage of living in a land where true liberty was enjoyed by the people, to drink the toast with more than usual enthusiasm. It is needless to say that the request was most warmly responded so.

The next toast was "The Queen Dowager, Prince Albert, Albert Prince of Wales, and the rest of the Royal Family;" which afforded another opportunity to the Company to display their loyalty.

In proposing the next toast, "The Pharmaceutical Society," the Chairman briefly alluded to the origin of the Society, which embraced the three-fold objects of Protection, Education, and Benevolence. He said it might be traced to a small association of Druggist's Assistants, among whom their present Secretary Mr. Smith, took an active part, who, from motives of benevolence had instituted a sort of Benefit Society. Subsequently, when Mr. Hawes's bill threatened the imposition of restrictions injurious to the interests of the body of Chemists and Druggists, the active members of the little association referred to, together with Mr. Farmar, called the attention of the trade to the necessity for an extensive combination among the Druggists throughout the country for their mutual protection. Meetings were in consequence held, and a feeling generally expressed, that the best and only method of securing the maintenance of the privileges hitherto enjoyed by the body of Chemists and Druggists, consisted in promoting a better education of the members of the body. The Pharmaceutical Society was formed for the purpose of carrying out these objects, and the extensive support which it almost immediately received, afforded evidence of the correctness of the views taken by those who founded it. Already, he said, in conclusion, the influence of this Society is becoming apparent, and a new race of Pharmaceutical Chemists is being rapidly formed, who, with the benefit of a sound education, will claim the confidence of the public and of the medical profession.

The toast was drank with enthusiasm

The CHAIRMAN then claimed the attention of the meeting to the toast of the evening, involving the subject which had especially called them together. He trusted that the company present would not allow his inexperience in the duties of his present office to influence injuriously the cause of the Benevolent Fund, which they had met there for the purpose of supporting and extending. It was highly gratifying to him to see around him so many of the most influential and wealthy members of the trade to which they belonged. But whilst they were enjoying the festivities of the table, it became them all to remember that some of their brethren probably wanted the necessaries and comforts of life—that even the most prosperous among them were subject to the vicissitudes of this world—and that either they, or some of their families, might some day be forced to seek assistance from the fund they were then establishing. It would be a great consolation to many to feel, on the bed of sickness, that whatever might happen, there was at least a prospect of succour and support for those who needed it. He felt assured that those who attended there that day were actuated by feelings of benevolence, and needed no observations of his to stimulate them to the furtherance of the object they had in view. He would, therefore, leave the cause in their hands, and propose to them the toast of "The Benevolent Fund."

The toast was warmly responded to, and while the lists of subscriptions were passing around the tables for signatures—

The CHAIRMAN proposed "The Health of the College of Physicians," stating that the Chemists and Druggists were much indebted to many learned and distinguished members of that body, who had greatly contributed by their writings and teaching to the advancement of the knowledge of Materia Medica and Pharmacy in this country,

Dr. A. T. THOMSON returned thanks on behalf of the learned body to which he belonged, and expressed the satisfaction and pleasure he felt in being present to witness the enthusiasm of the Chemists and Druggists in promoting the benevolent objects for which they had met. The College of Physicians was indeed interested in the leading object for which the Society was established, namely, improved education; for how could the Physician calculate on any satisfactory result from his practice, unless those who prepared the remedies were properly qualified, and the medicine accurately prepared? He had watched the progress of the Society from its commencement, which he considered highly satisfactory, and he had no doubt the public at large, as well as the profession, would derive much benefit from the proficiency of the rising generation of Pharmaceutical Chemists.

The next toast proposed, was "The College of Surgeons," which was acknowledged by Mr. A. Ure, who alluded to the increasing influence the Society enjoyed, not only in this country, but in most of the Continental states, where frequent allusion was made in the several scientific journals to the proceedings of this Society, whose transactions he constantly saw quoted. He considered that the exertions of the Society in promoting education, were of great importance to the whole medical profession.

The CHAIRMAN then proposed "The Health of the Apothecaries' Company."

Mr. JACOB BELL rose to respond, observing that as he found that

there was no representative of the Apothecaries' Company present, he took upon himself the task of responding to the toast, on the ground that he had for many years been exerting all his influence to promote harmony and fraternity between the Apothecaries and the Chemists. In days gone by, feuds and dissensions had existed between these two bodies, but, happily, these had of late years, to a great degree, subsided, and he trusted the day was not far distant when the jealousy which had led to these discordant feelings would entirely cease. In saying so much, he knew that he was expressing the sentiments of many Apothecaries, among whom were some of his most intimate friends. It was proper to add, that while he would always be in the foremost ranks of those who were advocates of harmony and fraternity, yet, if at any time any attack should be made upon the Chemists and Druggists, whoever might be the assailants, he was prepared to come forward with his utmost energy and zeal in the defensive on behalf of his brethren.

The Chairman next proposed the health of "Mr. Bell, the Editor of the *Pharmaceutical Journal*."

Mr. Jacob Bell, in acknowledging the toast, took occasion to allude to the several objects of the Pharmaceutical Society, whose Benevolent Fund was the prominent subject of discussion on that occasion. The Society had in view three grand objects:—First, the protection of the general interests of the Members. Secondly, the advancement of the art and science of Pharmacy. Thirdly, the Benevolent Fund. The importance of the first of these objects had been proved on several occasions by the successful resistance of unjust Bills in Parliament, which, if they had passed, would have inflicted a serious injury on Chemists and Druggists generally. He need only allude to those Medical Bills, the tendency of which was to destroy the independence, and curtail the privileges of the body; and the Spirit Licence Bill, which, as originally proposed, would have subjected the trade to an annual tax of two guineas, ond the inquisitorial supervision of excisemen—an evil warded off entirely by the energetic opposition of the Society. But it must be borne in mind that the second object of the Society, namely, education, was even more important than the former, since the Chemists could not hope to improve and maintain their position unless they could substantiate their claim to respect by raising their standard of qualification as Pharmaceutical Chemists. In confirmation of this statement, the evidence lately given before the Parliamentary Committee might be alluded to, for, although the Committee professed to exclude Pharmacy, they had made various inquiries respecting Chemists and Druggists: and what was the nature of these inquiries?—Have Chemists and Druggists any education?—are they an incorporated body?—have they any examinations?—This was the kind of inquiry instituted by the Committee, and the questions had been answered erroneously by persons who knew nothing at all about the facts of the case. It was more than probable that the Chemists would have occasion to come forward again in self-defence: they would never be secure from attacks and imputations until they had obtained an Act of Parliament recognizing their system of Pharmaceutical education and examination, and giving them that position which they ought to occupy as an important branch of the medical profession. This could only be obtained by the union of their influence, and by a determined

and persevering effort. Some Members had complained that the labour of seven years had not resulted in an Act of Parliament. He (Mr. Bell) had worked zealously during those seven years in the undertaking, and he would willingly, if necessary, give up seven years more for the attainment of the object in view. He trusted, however, that long before the expiration of that time the efforts of the Pharmaceutical Society would be crowned with success. He concluded by expressing a hope that the result of the meeting would be to promote harmony and fraternity among the Members, as well as the benevolent object for which they had assembled.

Dr. Thomson proposed the health of "The Chairman," who in reply stated, that if his services had been of any use to the cause, and had given satisfaction to the friends by whom he was surrounded, he was amply rewarded. He felt assured that much good would result from their meeting, not only in the extension of the Benevolent Fund, but also by promoting a friendly feeling and intercourse among the Members of their body.

The health of Mr. Smith and Mr. Farmar was drank, and feelingly replied to, as also was that of Mr. Redwood.

Towards the conclusion of the meeting, Dr. Thomson gave the health of "The Ladies," which he prefaced by an appropriate speech; and Mr. Waugh proposed the health of the Pupils who had that morning received the rewards which their talents and industry, had entitled them to, as the successful competitors for the prizes awarded at the examination in Materia Medica.

The reading of the Lists of Donations was continued at intervals during the latter part of the meeting, when the following were announced:—

DONATIONS.

DONATIONS.	£	s.	d.
A Friend, per Mr. Bell	5	0	0
A Friend to Physic	1	1	0
Aire and Calder Company	2	2	0
S. and G. Aldren	2	2	0
Mr. Alfred Allchin	1	0	0
S. and G. Allen	2	2	0
Mr. Robert Allen, 40, Aldersgate Street	1	1	0
Mr. Appleton	0	10	6
An Associate	0	10	6
Wm. Atkinson, Esq.	5	5	0
Mr. Bailey	1	1	0
Mr. Baigent	1	1	0
Baiss, Brothers, and Co.	10	10	0
Mr. Ball ..... *An.* 10*s.*		—	
Mr. Balmer		—	
Barclay and Sons	5	0	0
Mr. John Barclay	5	5	0
Mr. T. Barkley	2	2	0
Mr. J. Ballard	1	1	0
Mr. George Barlow	2	2	0
Barron and Harvey	10	10	0
Mr. Wm. Bartlett	1	1	0
Mr. W. Thos. Bass	3	3	0
Mr. Bateman. Stroud	1	1	0
Richard Battley, Esq.	5	5	0
Batty and Co., Aldersgate Street	1	0	0
Mr. Baumborough	1	1	0

DONATIONS.	£	s.	d.
Mr. John Bell	21	0	0
Mr. Jacob Bell	15	15	0
Mr. Fred. John Bell	2	2	0
Mr. James Bell	2	2	0
Mr. Bennett, Bath ..... *An.* 10*s.*		—	
Mr. T. Bennett	0	10	0
Mr. Bentley	1	0	0
Mr. Bird	2	2	0
Mrs. Bird	1	1	0
Mr. A. R. Bird	1	1	0
Mr. C. J. Blake	2	2	0
British & Foreign Alkaloid Co.	5	5	0
Mr. Bourdas ..... *An.* 5*s.*		—	
Brooks and Claxton	5	5	0
Brown and Sons	1	1	0
Mr. Brown ..... *An.* 5*s.*		—	
Mr. W. Burbidge, 74, Aldersgate Street	10	10	0
Butler and McCullock	5	5	0
Mr. Button	2	2	0
H. S. Cafe, Esq.	5	0	0
Mr. Carr ..... *An.* 5*s.*		—	
Mr. John Cole	3	3	0
H. J. Coombs, Esq.	5	0	0
Mr. R. C. Crafton, Croydon	1	1	0
John Churchill, Esq.	5	5	0
Crane and Graham, Thetford	1	0	0
Mr. Cross, Holborn	1	1	0

DONATIONS.

	£	s.	d.
Mr. J. Davidson, Berwick	0	5	0
Davy, Macmurdo & Co.	10	10	0
Mr. Henry Deane	5	5	0
Mr. W. Delatouche .. *An.* £1 1*s.*		—	
Mr. T. H. M. Dutton, Bath	5	0	0
Mr. John Earland .. *An.* £2 2*s.*	10	10	0
Mr. William Edwards	1	1	0
Mr. Edwards	1	1	0
Mr. G. Edwards, Dartford	2	0	0
Ego	0	10	0
Mr. Ellis	1	1	0
John Ellis, Esq.	1	1	0
Ellis and Hall	1	1	0
Mr. Erland	2	2	0
Evans, Lescher and Evans, London	10	10	0
Evans, Sons, & Co., Liverpool	10	10	0
Mr. R. A. Farmar	5	5	0
Professor Faraday	5	0	0
Fergusson and Foster	1	1	0
Mr. R. Ferris, Bristol	2	2	0
William Field, Esq.	2	2	0
Mr. Fitt, Barking *An.* 10*s.*		—	
Mr. Fletcher	5	0	0
John Forster, Esq.	1	1	0
Samuel Foulger and Sons	5	5	0
Mr. William Fox	2	2	0
Mr. Francis	0	10	6
Mrs. Fynmore	26	5	0
Mr. John Garle	5	5	0
John Peter Gassiot, Esq.	1	1	0
Mr. T. Glaisyer, Brighton *An.* £1 1*s.*		—	
Mr. F. B. Giles	1	1	0
De Grave, Fanner, and Short	2	2	0
Mr. John George	1	1	0
Mr. Gibbs	1	1	0
R. A. Gray, Esq.	5	5	0
Donald Gray, Esq.	5	5	0
Mr. Grignon	1	1	0
Godfrey and Cooke	10	10	0
Mr. W. A. Hallows	5	0	0
Mr. Hawke	1	1	0
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ORIGINAL AND EXTRACTED ARTICLES.

ABSTRACT OF REPORT

ON DR. H. C. JENNINGS'S SACCHAROMETER,

BY MESSRS. BRANDE AND COOPER.

Relative Quantities of Crystallizable and Uncrystallizable Sugar in Raw Sugars, and in Cane Juice.

The Appendix, No. 1, to the Fourth Report from the Select Committee of the House of Commons on Sugar and Coffee Planting (ordered to be printed 17th March, 1848, Par. Num. 184), is entitled "Copy of the Report of Professors Brande and Cooper on a new kind of Saccharometer by Dr. Jennings." This Report is dated "London, 21st January, 1847," and is addressed to C. Scovell, Esq.

The authors were desired by the Commissioners of Customs to test the correctness of the instrument in question, which, according to Dr. Jennings, is calculated to indicate the quantity of crystallizable and of uncrystallizable sugar contained in the various denominations of raw or unrefined sugars usually imported into this country, it being presumed that all such sugars are essentially mixtures of the two varieties just mentioned, one of which is represented by white sugar-candy or double-refined sugar, and the other by the purest colonial molasses.

"Now it appears," they state, "that the quantity of molasses or uncrystallizable sugar contained in the lowest or worst samples of raw sugar never exceeds 30 per cent.; so that the scale of Dr. Jennings's instrument may be said to commence its indications at that point, and to terminate at pure sugar, the former point being marked 70°, as indicating that the sample under examination contains 70 per cent. of pure or crystallizable sugar; and the latter 100°, implying that it is entirely pure sugar. The

intermediate degrees show the centesimal parts of pure sugar contained in any given sample between the above extremes.

"In using the instrument, one part by weight of the sugar to be examined is dissolved in two parts by weight of water, and the solution, when perfect, is transferred into a tall cylindrical glass vessel; the instrument is then immersed into it at the temperature of 60°, and the result carefully read off upon the graduated stem.

"The quantity of sugar required for each examination is, as the instrument is now constructed, ten ounces, which is dissolved in twenty ounces of water to form the required solution.

"On the back of the scale of Dr. Jennings's instrument, and corresponding to the ninety-third division, is the mark Q.S. It represents the Queen's Standard Sugar, 'as taken from the cellars, and simply air-dried,' and is, of course, assumed as consisting of 93 per cent. of crystallizable sugar, and 7 per cent. of uncrystallizable sugar or molasses.

"The 0°, or zero of Dr. Jennings' scale, represents a solution of one part of the best colonial molasses, of the specific gravity of 1·3326, and two parts of water, the specific gravity of such a solution being assumed as =1·0994 at 60°, and the mark 100° on Dr. Jennings's scale represents a solution of one part of double-refined or pure crystallized sugar in two parts of water, which solution has a specific gravity =1·1468 at 60°."

Messrs. Brande and Cooper were provided with a standard instrument, acknowledged as such both by Dr. Jennings, and by the proper officers of the Customs, and they also received, "through the hands of the officers of the Customs, samples of molasses and of pure sugar, and of the several denominations of colonial and other raw or unrefined sugars usually occurring in commerce, with the understanding that duplicate samples of these sugars should be retained at the Custom-house as standards of reference, in the event of any necessity arising of repeating our experiments, or otherwise verifying our results."

The first point to which they directed their attention, was the experimental verification of the data upon which the construction and graduation of Dr. Jennings's instrument are ostensibly founded. They next turned their attention to the actual composition of the different samples of commercial sugars supplied to them, as indicated by analysis, in order to determine the relative proportions between the crystallizable and the uncrystallizable sugars in such samples, so as to arrive at independent data by which they might test the accuracy of the indications of Dr. Jennings's instrument.

"The specific gravity of the best colonial molasses," they observe, "is assumed by Dr. Jennings as = 1·3326, and he represents the specific gravity of a solution of such molasses in twice its weight of water, as =1·0994, which he adopts as the 0° or zero of his saccharometer.

"The specific gravity of the sample of colonial molasses sent to us from the Customs was 1·373 at the temperature of 60°, and the solution of one part of this molasses in two parts of water had the specific gravity of 1·1042 at the same temperature. Assuming, therefore, that the specific gravities given by Dr. Jennings have also reference to the temperature of 60°, we reduced our standard molasses to the specific gravity of 1·33, so as to bring down the specific gravity of the solution of it in twice its weight of water from 1·1042 to 1·0994.

"The specific gravity of a syrup obtained by dissolving one part of pure crystallized sugar in two parts of water, is stated by Dr. Jennings to be =1·1468, and this density is, as we have already remarked, represented by

100° on the scale of his saccharometer. In two experiments in which we used the samples of refined sugar sent us by the Customs, we found the specific gravity of a solution, constituted as above, to be = 1·145 and 1·1476 at 60°. These numbers give a mean so closely agreeing with the specific gravity assigned to this syrup by Dr. Jennings, that we did not think it necessary to go into any further examination of this point, and they sanction our conclusion that the densities represented upon his saccharometer have reference to the temperature of 60° of Fahrenheit.

"We next proceeded to the verification of the point upon Dr. Jennings's instrument, marked Q S. (Queen's Standard). To this end, we first dissolved one pound of the standard sample of the Java sugar, marked No. 19 in our Custom-house list, in two pounds of distilled water, and when the solution was perfect, we found its specific gravity at 60° to be 1.1434 ; but on testing this syrup by our saccharometer, it indicated 95.5 instead of 93. The cause of this and some similar discrepancies we shall afterwards have occasion to advert to."

4. The reporters then proceeded to determine the specific gravities of the solutions or syrups obtained by dissolving one pound of each of the other sugars in two pounds of distilled water, and to ascertain the corresponding indications upon the scale of the saccharometer. All the solutions were examined at a temperature of 60° to 62° ; they were made by carefully weighing the sugar and the water.

5. Their next object was to submit the several samples of sugar to some independent mode of analysis by which they might determine, with sufficient accuracy for the purposes of this inquiry, the relative quantity of pure sugar corresponding to crystallized white candy, and of uncrystallizable sugar or molasses contained in each of them. For this purpose, after various trials (in the course of which they found that the reduction of certain metallic oxides by certain sugars did not afford accurate quantitative tests) they tried the action of several solvents, and at length devised and applied a means upon which they found they could rely, of separating the uncrystallizable from the crystallizable portion.

6. They formed certain mixtures of standard molasses, of the specific gravity of 1·3325, of pure sugar and of water, with a view of ascertaining the specific gravities of these mixtures of known composition, and of comparing them with the indications of the saccharometer. The principal mixtures upon which they operated, are described in the Report, and their specific gravities stated.

7. Lastly, they examined the several samples of sugar, in reference to their hygrometric qualities, ascertaining in the first place the loss of weight sustained by each variety, by drying it at 212°, until it ceased to lose weight, and then determining the quantity of water absorbed by each, in a given time from a humid atmosphere, at the temperature of 50°, so as to ascertain their relative weights in the extreme state of dryness on the one hand, and of dampness on the other.

The numerical results of this series of experimental investigations, are stated in four tables, which are here combined into one:—

No.	DENOMINATION OF SUGAR.	Specific gravity of Syrup.	Crystallizable Sugar per cent., as indicated by the Saccharometer.*	Crystallizable Sugar per cent., as indicated by analysis.†	Difference per cent. in the proportion of Crystallizable Sugar as indicated by the Saccharometer.	Loss by drying at 212°.	Gain by Moisture at 50°.
			PER CENT.				
These numbers are those attached to the samples in the Custom-House List. 1	Havannah, fine white	1·1458	97·90	97·0	+0·90	1·5	1·75
2	Ditto, good white	1·1461	98·00	97·8	+0·20	1·0	1·0
×3	Ditto, fine yellow	1·1436	95·00	95·5	—0·50	1·25	2·25
4	Ditto, good yellow	1·1441	93·75	94·5	—0·75	2·5	0·75
5	Bengal, fine crystallized white	1·1431	92·75	93·2	—0·45	2·0	1·5
6	Ditto, ditto, yellow	1·1435	93·00	90·0	+3·00	3·0	4·0
7	Ditto, fine white	1·1424	91·50	90·8	+0·70	3·0	4·0
8	Ditto, low white	1·1428	92·00	89·5	+2·50	1·0	3·0
9	Demerara (vacuum pan)	1·1441	92·75	93·5	—0·75	1·5	2·0
×10	Jamaica, fine white	1·1428	93·25	92·0	+1·25	3·5	3·7
11	Antigua, average quality	1·1423	89 75	89·5	+0·25	2·5	3·2
12	Trinidad, low muscovado	1·1405	89·50	85·5	+0·40	4·5	5·7
×13	Manilla, white	1·1441	94·75	94·0	+0·75	3·2	3·7
14	Ditto, brown	1·1417	89·50	90·2	—0 70	4·0	4·0
×15	China, white	1·1412	89·00	87·0	+2·00	4·0	4·5
×16	Bahia, fine white	1·1441	94·50	94·0	+0·50	2·5	2·7
×17	Ditto, good white	1·1423	92 00	91·5	+0·50	3·0	3·5
×18	Ditto, brown	1·1457	97·50	93·0	+4·50	4·5	4·5
×19	Java Sugar, standard sample	1·1434	95·50	95·0	+0·50	1·5	1·7
20	Loaf Sugar, single refined	1·1471	100·00	100·0			
21	Ditto, double refined	1·1472	100·00	100·0			
22	Antigua molasses	1·1042	0·	0			

"The samples marked × gave syrups which became ropy and mucilaginous within forty-eight hours; the solution of the other samples required a much longer time for the production of the same change."

* Two columns, stating the per-centage of uncrystallizable sugar are here omitted, for the sake of condensation: the quantity of uncrystallizable sugar per cent. indicated by the saccharometer and by analysis respectively, is the complement of that of the crystallizable; thus, in No. 19, Standard Sample Java Sugar, which contains by the saccharometer 95.50 and by analysis 95 of crystallizable sugar, the quantity of uncrystallizable sugar by the former is 4.50, and by the latter 5 per cent.; so that the quantity of uncrystallizable sugar is known by deducting in each case that of crystallizable from 100, the remainder being the quantity of uncrystallizable sugar. In this Table the composition of the samples is stated as respects the relative quantities only of the two kinds of sugar which they contain, without reference to insoluble residue.

† The sugars having been taken in their ordinary states of moisture; but the weight of crystalline sugar which is given has reference to that substance after having been dried at a temperature of 212°.

The Report terminates with the following conclusions, which the authors think themselves justified in drawing from the general results of their experiments:—

"1. That the composition of the different samples of raw sugar, as respects the relative quantities of crystallizable and uncrystallizable sugar which they contain, may be inferred from the specific gravities of their syrups, or solutions in given quantities of water; and that those specific gravities are conveniently shown by Dr. Jennings's saccharometer, which, instead of denoting the actual specific gravities in reference to distilled water as unity indicates at once the quantity of crystallizable and of uncrystallizable sugar in 100 parts of any sample under examination.

"2. That the temperature to which the instrument is graduated should be accurately observed, inasmuch as comparatively small variations in the temperature of the syrup materially affect its indications. The examination of the syrup, therefore, should always be made at that particular temperature to which the divisions upon its scale refer, or, if this be found inconvenient, tables should be constructed applicable to the indications of the saccharometer within a certain range of temperature.

"3. That the occasional discrepancies between the indications of the saccharometer and the results of our actual analyses (and which are evident, especially in five of the cases given in the preceding table, when they are seen to amount to more than one per cent.) probably arise principally from two causes: the first, and perhaps the chief cause, being the comparative state of the sugar, as to its degree of humidity; and the other, the occasional presence of some foreign matter in it, as announced by the rapid tendency of the syrup to become ropy or mucilaginous.

"There is a further peculiarity in several descriptions of unrefined sugar, which is shown by their tendency to become tenacious and gummy when retained at a temperature of 212°, till they no longer lose weight, instead of drying, as is the case in the greater number of instances, into a friable crystalline powder.

"We, therefore, think, that in reference to the first source of error in the announcements of the saccharometer, the samples of sugar, the commercial values or denominations of which are to be determined by this instrument, should in all cases be examined in a given and definite state of dryness, and that this might be adequately attained by retaining them in a dry and warm place for some hours previous to their examination; or, if the samples requiring to be tested are very numerous, and of various qualities, it might be desirable to construct a small stove for the purpose of reducing the whole of them to an uniform and definite state of drynesss.

"4. We would suggest that, in the construction of these saccharometers for general practical use, great attention should be paid to the method of graduation in reference to the effect of the immersion of variable portions of the stem of the instrument in the liquor, and that the stem should be so small as is consistent with safety from accident, and the legibility of the figures upon it; and we think that these instruments, instead of being made of glass, which is fragile, or of platinum, which is very expensive and difficult to work, and liable from its softness to be bruised, might conveniently be constructed of brass, gilt by the electro-chemical processes now in common use.

"5. Having found that there is often some difficulty in regard to certain denominations of raw sugar, of obtaining a fair average sample in consequence of the variable quantity of the bulk, and of the lumps which are diffused though it; and having ascertained that these differ in composition from the more pulverulent or granular portion, we are of opinion that

in drawing samples for examination, these inequalities should be attended to, and that no pains should be spared to insure the drawing of an uniform sample, so as to obtain a fair average of the bulk.

"William Thomas Brande.
"John Thomas Cooper."

To the preceding abstract it seems proper to annex the results of the examination of cane juice from the West Indies, by Mr. George Phillips, Chemist to the Excise, which appears in the Sixth Report on Sugar and Coffee Planting, p. 107—108. These results are as follows:

"1stly. The density of highly concentrated cane-juice, appears to be 1·4925.

"2dly. That in that state it may be expected to afford about 70 per cent. of sugar, and 30 per cent. of molasses.

"3dly. That vinous fermentation takes place in it to a certain extent.

"4thly. That every 112th of it may be assumed to afford 10 gallons of proof spirit.

5thly. That in a highly concentrated state, it contains 13½ per cent. of water, and that that amount seems necessary to enable it to retain the character of liquid juice."

[E. W. B.]

ON THE COMPOSITION OF THE SO-CALLED SESQUICARBONATE OF SODA.

Sir,—Having lately had occasion to purchase some sesquicarbonate of soda, I have been somewhat surprised to find that the only article to be procured under that name is a bicarbonate. Whether this is understood by the trade generally, I cannot say, but I know that fourteen or fifteen years ago, the sesquicarbonate of soda then sold in the shops had the composition assigned it by Mr. Philips, in his translation of the Pharmacopœia of 1836, where no mention is made of the bicarbonate. There has been, I know, an alteration of late years in the mode of carbonating the carbonate of soda, which has probably led to the introduction of this article, the medicinal properties of which are no doubt fully equal to those of the sesquicarbonate, but still it would be as well to call things by their right names, for I have bought from most respectable sources, no less than seven samples, all purporting to be sesquicarbonate of soda, which, however, proved on examination to have the following composition:—

Soda, one atom	32
Carbonic Acid, 2 atoms ...	44
Water, 1 atom	9
	85

I am, Sir, your most obedient Servant,

Ryker Bar, Newcastle-on-Tyne, May 15, 1848. Lewis Thompson.

[The name adopted in the London Pharmacopœia, indicates that the salt alluded to should contain three atoms of carbonic acid to every two atoms of soda, but the process which is given, if carefully and efficiently

conducted, produces bicarbonate of soda, having the composition represented by Mr. Thompson's analysis. The process of the Pharmacopœia, however, is not a good one for carbonating the soda, nor is it that now practically adopted by manufacturers. It is probable that the specimen which was analyzed by Mr. Phillips, and on the composition of which the name "sesquicarbonate of soda" was founded, had been imperfectly made by the process of the Pharmacopœia, the carbonic acid gas not having been passed into the solution to complete saturation. The manufacturers process consists in exposing dry and effloresced carbonate of soda in an atmosphere of carbonic acid, until the absorption which takes place has ceased, and then dissolving out any trace of carbonate that may remain, as well as other salts originally present, by means of a saturated solution of the bicarbonate. The product thus obtained is a definite compound, consisting of Na O, 2 CO_2, HO. The name *sesquicarbonate of soda* cannot be correctly applied to this, it is a *bicarbonate.* It is, however, the only definite compound that can be obtained even by the process of the Pharmacopœia, for it is admitted by Chemists that although sesquicarbonate of soda is sometimes produced under particular circumstances, yet that its production cannot be relied on by any artificial process. It is probable that the specimens of so-called sesquicarbonate of soda, which have been found on analysis to have the composition of a sesquicarbonate, have been mixtures of carbonate and bicarbonate rather than definite compounds.

We are disposed, therefore, to consider the name *sesquicarbonate of soda*, as adopted in the Pharmacopœia, to be erroneous. The process of the Pharmacopœia yields *bicarbonate of soda*, although it is not a good process for the purpose, and the description of the product of the process, which is given in the notes of the Pharmacopœia, applies to the *bicarbonate.*

Manufacturers are, we think, right in making the only compound, namely, the bicarbonate, which with a larger proportion of carbonic acid than is contained in the carbonate, can be obtained in a uniform condition; and Chemists are, we also think, right in using this compound, which answers to the description given in the Pharmacopœia, and may be prepared by its process. We trust that in the next Pharmacopœia the name will be altered.—Ed. Ph. J.]

ON QUINOIDINE.

BY DR. F. L. WINCKLER.

The following facts may serve as a proof that quinoidine, or amorphous quinine, is not contained, as such, in the barks, but is accidentally generated from cinchonine during the manufacture of quinine.

One half of a quantity of several pounds of tolerably pure crystallized cinchonine was successfully manufactured into the neutral sulphate, but the process failed with the other half, in consequence of the incautious addition of too much concentrated sulphuric acid, and of the mixture being heated rather too strongly. The consequence was, that only about one-third of the expected quantity of sulphate of cinchonine was obtained as coloured crystals, whilst the rest remained behind in a decomposed state as a brown liquid, which, upon the addition of some alkali, yielded a dark brown mass of a strongly bitter taste, and of the consistency of turpentine.

A sample of the brown sulphuric liquid was examined, and in order to obtain it in a pure state, the alkaloid contained in it was diluted with water filtered, and at common temperature, precipitated by an excess of carbonate of soda. The precipitate was a dark brown mass, which was again dissolved in diluted sulphuric acid, and precipitated first by carbonate of soda, and at last by an addition of sulphate of soda. A considerable quantity of an

almost black soft mass fell down, and the supernatant liquid was brownish-yellow, and threw down, upon the addition of caustic ammonia, an abundance of a pulverulent, at first almost white, precipitate, which consolidated itself slowly into a dark yellowish-brown turpentine-like mass, that could only with difficulty be dried into a dark brown substance. This mass possessed, physically and chemically, all those properties, which were observed in that substance which Dr. Winckler had obtained from the commercial quinoidine by common ether.

In order to obtain and to compare both alkaloids in the purest possible state, they were dissolved in absolute alcohol at common temperature, digested with animal charcoal at +40° R., filtered when cold, and evaporated in a water-bath until the weight of the residue no longer diminished. Both samples now appeared in the form of a dark-brown very tough mass, transparent only in very thin layers of a slight peculiar smell, quite like that which commercial quinoidine possesses. Both substances were soluble in almost all proportions of strong alcohol, but not in (absolutely pure) ether, and also not in water. Diluted acids were perfectly neutralized by an exactly equal quantity in weight of both alkaloids, the saturated, dark reddish-brown, watery solutions of the salts, were so perfectly decomposed by carbonate of soda, that the filtered solution of the salt appeared colourless, and tasted but imperceptibly bitter. In the solution with diluted acid, the amorphous alkaloid, which was formed from the cinchonine, let fall an imponderable quantity of a flakey fatty substance, which was not further examined.

Both samples of the amorphous alkaloid showed also the same properties on being heated in a small platinum spoon; they melted, emitted vapours of a bitter taste, ignited and burnt with a bright-red strongly-sooty flame to a voluminous cinder, which was consumed with difficulty, still without leaving any residue. When both samples of the alkaloid were heated in a glass tube, a solid sublimate in no small quantity was obtained, which agreed in all its properties with that which is formed by heating the pure cinchonine. The peculiar smell of quinol, which is perceived when heating quinine and amorphous quinine, was not noticed when the two mentioned substances were heated.

In order to prove still more strongly the identity of the two alkaloids, the platinum double salt of the same was formed, and the quantity of platinum determined in both. With this view, one grain of each alkaloid was dissolved in two drachms of water, by the addition of fifty drops of pure concentrated muriatic acid, and precipitated by an equal quantity of chloride of platinum, so that there was a small surplus of the latter. After twenty-four hours, the precipitation of the platinum salt in both mixtures was perfect. Both precipitates having been dried at 60° R. were nearly equal to one another in quantity, but somewhat differing in colour and aggregation.

The platinum salt that had been formed in the quinoidine obtained from cinchonine, was light brownish yellow, loose, pulverulent, crystalline; that formed from the commercial quinoidine had almost as light a colour as that obtained from pure cinchonine, it was fine, pulverulent, loose, cohesive. The proportion of platinum which was determined by combustion was in either the same and rather larger; for the amorphous alkaloid obtained from cinchonine left behind from its platinum combination 24.15 per cent. of metallic platinum. The platinum salt of the common quinoidine yielded 23.35 per cent. of platinum.

This result establishes the identity of both varieties of the amorphous cinchona-alkaloids beyond doubt, and makes it appear very probable that that proportion of the commercial quinoidine which is not dissolved in absolutely pure ether, and which combines with acids to form salts, is a peculiar modification of cinchonine—that the amorphous alkaloid does not

pre-exist in the bark, but is produced by the decomposing effect of the acids upon the alkaloids, and that it depends on the duration of the action of the acids and on the peculiar chemical condition of the existing alkaloids of what nature the generated quinoidine will be.

According to what is at present known of the composition of quinoidine, it appears as if quinine resisted, under the circumstances which concur in the preparation of the sulphate of quinine on a large scale, more energetically the influence of the decomposing acids, than the cinchonine.

The following observations concerning the relation of the cinchona-alkaloids to hyposulphite of soda, will not be out of place here.

If a somewhat concentrated watery solution of neutral muriate of quinine be mixed with a solution of hyposulphite of soda, a brilliant white precipitate is immediately formed, which is almost insoluble in water, and which, when washed and dried, appears crystalline.

Muriate of cinchonine forms with hyposulphite of soda, almost instantaneously, small but distinctly formed four-sided pyramids. Both combinations are hyposulphites, for if in the air-dried condition concentrated sulphuric acid be formed over them, they yield sulphurous acid, sulphuretted hydrogen, and with diluted sulphuric acid they form under the simultaneous development of sulphurous acid and elimination of sulphur, sulphates of quinine and cinchonine.

On the other hand, the solution of muriate of quinoidine is not precipitated by hyposulphite of soda. This relation of the hyposulphite of soda Dr. Winckler makes use of to detect in amorphous quinine the presence of crystallizable quinine and cinchonine.—*Buchner's Repertorium.*

MICHROCHEMICAL EXAMINATION OF ANIMAL TISSUES.

BY DR. DONDERS,

Lecturer on Anatomy and Physiology in the School for Army Physicians at Utrecht.

(*Concluded from p.* 543.)

5. *Concentrated sulphuric acid.* ($S O_3 + H O$).—The most important result of this acid was that of its application to the horny textures, where it isolates the lamellæ; so that a connecting tissue (intercellular substance) may be dissolved by it, without its affecting the walls. In no respect, however, can we obtain from sulphuric acid, or from any other reagent, as much advantage as from potash and acetic acid. We have, therefore, only in the beginning of our operations made use of a large number of reagents, and afterwards confined ourselves in preference, if not exclusively, to acetic acid and potash. Only the following we will yet observe with regard to sulphuric acid:

For most *horny textures* a few hours are sufficient to isolate the lamellæ by rubbing. Tortoiseshell, however requires several days, and even then the isolation succeeds but imperfectly; quills offer equal difficulties. The lamellæ, however, remain at the same time smooth and strongly curved (cow horn). The walls of the cornified lamellæ themselves are very difficult to be dissolved in sulphuric acid. Those of the tortoiseshell were not yet isolated after six months; but their outlines were distinctly to be recognised. In the same space of time, those of the epidermis were certainly isolated, but not yet dissolved. By the addition of water they formed into cells, so that the contents of cornified cells appear to be dissolved by sulphuric acid.

With regard to the effect of sulphuric acid upon the *hair*, we can confirm everything that Valentin has stated concerning it in *Wagner's Manual.* Sulphuric acid is excellently adapted for studying the structure of the hair.

The fibres of cellular tissue swell rather readily into a gelatinous mass;

after some hour's continued operation the elastic fibres are still to be seen glittering through it, less distinctly however, than after the influence of acetic acid.

Involuntary muscular fibres become gelatinous, but lose their character again if acetic acid be added. The elastic fibres are also here seen shining through the mass.

The *striped primitive bundles of voluntary muscle* are, after twenty-four hours, gelatinous and swollen, but sharply marked, so that the sarcolemma does not appear to be dissolved. By an addition of water, they lose their gelatinous appearance, shrivel together, and again exhibit primitive fibres.

Elastic fibres resist many days this acid; but after some months they dissolve with a brown colour.

The *substratum of true cartilage* is for the most part already dissolved after four hours, whilst the cartilage corpuscles still resist; after twenty-four hours there are still cartilage corpuscles and cells seen floating about, but the intercellular substance is dissolved.

The *substratum of fibro cartilage* is, after four hours, swollen like gelatine; more time is required to dissolve it.

The *substratum of the elastic cartilages* is, after seven hours, swollen like gelatine; if water be added, it shrivels and contracts for the most part the cavities, in which the now dissolved cartilage corpuscles were situated.

The *cartilage corpuscles* resist the acid longer than the matrix of true and fibro-cartilage, and not so long as that of the elastic. Of the latter, therefore, the constituents of the cartilage corpuscles can be dissolved in sulphuric acid, and of the first, those of the matrix. Of the cartilage corpuscles, the nucleus resists longer than the cells, and the cells longer than the surrounding transparent substance.

Bone cartilage becomes, after a few hours, gelatinous and transparent; only if water be added, by which the gelatinous character is lost, the bone corpuscles appear; in each of them are now to be seen one or two, sometimes a whole row of nucleoli.

6. *Concentrated nitric acid* we have employed only in a few cases. If employed by itself, it can only serve to show the relation of elementary structures to it, *i.e.*, the characteristics of the latter. But if mixed with ammonia it becomes very important. If elementary forms, containing protein, are heated with nitric acid, they form xanthoproteic acid; if now ammonia be added, the elementary form assumes the yellow colour of xanthoproteate or of ammonia, which serves as a proof that it does contain protein. This soluble substance, however, joins easily those elementary forms which are situated in its neighbourhood; we must, therefore, be very cautious in drawing conclusions from this reaction. Most textures are, moreover, so strongly saturated with liquor sanguinis, that the whole assumes a more or less yellow colour. This is even to be observed in the ligament of the neck, which, however, after being boiled with acetic acid, loses entirely this quality. It is therefore necessary that the parts should first be well washed out with water, to leave them for a few hours in water, and then to dry them, before we proceed to the experiment, which must be performed during daytime, and by a low magnifying power.

The cell-wall of the corneous cells, the fibres of organic muscle, muscular primitive bundles, and other elementary textures containing protein, become yellowish by it. Cellular tissue fibres and elastic fibres do not display the yellow colour, if the prescribed caution has been taken. If thin transverse sections of well-washed vascular walls, dried in common temperature, are again placed for some hours in water, then dried on a glass plate, a few drops of nitric acid added, the whole heated over a flame, and the nitric acid saturated with ammonia, only the middle membrane of *arteries* appears distinctly yellow, whilst the rest, as well as the membranes of the

veins, possess no trace of this yellow colouration, or at most only a shade of it. The result would perhaps be even more perfect if the membranes were first treated with acetic acid. According to this it appears, that only the middle membrane of the arteries contains elementary forms, containing protein (muscular fibres), but not so the other membranes and the veins. Lymphatic vessels I have not yet examined in this respect.

7. Among the chemical means which are employed for hardening the textures, none appears preferable to drying them; indeed, in most cases, it is superior to them. Only for the brain, and for the internal parts of the eye, *chromic acid* might be more advantageous.

8 and 9. By alcohol and a solution of corrosive sublimate, many elementary forms become darker, by shrivelling together: they show distinctly the rosary-like form of the muscular fibres from transversely striped primitive bundles.

10. For colouring the elementary forms, *iodine* might be more usefully employed than has been done till now. Elementary forms that have become quite invisible by being treated with alkalies, may be coloured, and thus made again visible, by adding tincture of iodine after the alkali has been saturated with acetic acid—a small excess of acid is not prejudicial, but the alkalies must at least be saturated.

LEECHES.

The ground on the sides of these mountains is always in a moist and slimy condition; and is the habitation of millions of leeches. In my first excursion to the mountains I observed the feet and legs of the Indians, who were cutting a path for me, covered with blood, and at first I fancied that they must have wounded themselves with the thorny shrubs which they were cutting. On inquiry, however, I found that it was the leeches that were doing the mischief, and in a very little time I had a good many specimens of their powers upon my own skin. There were two species, one a small linear one, and the other nearly round. Whenever the former fixed upon the Indians, they invariably pulled it off, but they never interfered with the little round one. I found that the reason for this was, that the latter, if taken off by force, would leave a very painful wound; but if allowed to suck until it was full, it would drop off of its own accord, and leave scarcely a mark; the other species might be taken off with impunity. At first, when they fixed themselves upon me, which they did through my stockings, I set to work to pull them off, without regard to species, although warned by the natives of the impropriety of doing so. In a short time my legs were covered with blood, and the wounds annoyed me with a kind of itching soreness for several days afterwards.—*Wanderings in China.*

ON AUSTRALIAN AND TURKEY GUMS.

BY DR. HOPFF.

Dr. Hopff lately received two sorts of gum, one of which was said to come from Australia, the other from Turkey. The first consisted of reddish-brown and brownish yellow, mostly semi-globular, tear-shaped, and moderately transparent pieces, to which the bark was partly adhering; internally it was much cracked. It was not hygroscopic, was easily pulverized, glittered like glass, and furnished a slightly-coloured powder and a solution, which possessed no peculiar taste. The Turkey gum was externally like the usual *Gummi Arabicum in sortis*, consisting mostly of whitish-yellow and light yellow pieces, without taste. The following table presents the reactions of the solutions of both sorts, as well as of other gums. These liquids had been so diluted, that they could be filtered :—

TESTS.	GUM FROM AUSTRALIA.	GUM FROM TURKEY.	GUM ARABICUM (*Off*).	GUM GEDDA.	GUM SENEGAL.	GUM ARABICUM *In dark Brown Pieces.*
Bichloride of mercury	No effect	No effect	No effect	No effect	No effect	No effect.
Tincture of iodine.	Scarcely deeper coloured	Darker turbid	Darker turbid	.....Blackish brown Turbidness.		
Subacetate of lead.	Brownish white, turbidness.....	White flocculi, which immediately sank	Smaller flocculi, but also immediately precipitating	Whitish flocculi ..	White flocculi	Coloured flocculi.
				Upon the addition of more of the test becoming a firm jelly.		
Sugar of lead.....	Turbidness	White flocculi	White flocculi.. ..	.....No reaction.		
Protonitrate of mercury	Grey turbidness ..	White turbidness, by shaking redissolves	Like Turkey gum.	White clouds, disappearing if but little of the test be used; but remaining if more be employed.		
Pernitrate of mercury	Feeble turbidness.	Hardly changed ..	Like Turkey gum.			
Chloride of iron....	..... In the diluted state no remarkable change.			Increase of consistency.....	No effect	No remarkable change.
The same concentrated	Viscid, uniform, mucous, not firm after 24 hours ..	Firm jelly, firmer after 24 hours ..	Like Turkey gum.	Consistent mucus	The least consistent.....	Brown mucilaginous without perceptible increase of consistency
Two drops to the scruple of the solution of gum ..	.....One part of gum in three parts of water, regular slime.					
The same concentrated	Little increase of consistency	Almost equal to, but somewhat more liquid than Australian gum		Firm jelly	Firm jelly.	

Chlorine appeared to render the mucilage, of Turkey gum only scarcely more viscid.
Litmus was in all without effect, and on being shaken all the diluted solution showed almost the same character.—*Pharmaceutisches Central Blatt.*

ON THE QUANTITY OF STARCH YIELDED BY DIFFERENT PLANTS.

BY JOHN SHIER, LL.D.

In the following table I have given the result of a series of trials made in the Colonial Laboratory. The roots were all fresh dug, and, with two exceptions noticed in the remarks, were fair average specimens. The process was the common one. The grater, or rasping machine, was of copper, to avoid injuring the colour of some of the starches, which an iron grater is liable to do :—

PERCENTAGE OF STARCH YIELDED BY DIFFERENT PLANTS.

No.	NAMES OF PLANTS.	Percentage of Starch.	REMARKS.
1	Sweet Cassava (*Janipha Loeflingii*, H. B. K.)	26.92	
2	Bitter Cassava (*Janipha Manihot* H. B. K.)	24.84	
3	Another Sample	20.26	
4	A third.....	16.02	
5	Common Yam (*Dioscorea sativa*, Linn.).....	24.47	
6	Arrow-root (*Maranta arundinacea*, Linn.)	21.43	Roots scarcely ripe
7	Another Sample	17.28	
8	Barbados Yam (*Dioscorea* ——?)...	18.75	
9	Tannia (*Caladium sagittæ folium*, Linn.)	17.05	
10	Another Sample	15.35	
11	Guinea Yam (*Dioscorea aculeata*, Linn.)	17.03	
12	Plantain (*Musa paradisiaca*, Linn.)	16.99	
13	Sweet Potato (*Batatas edulis*, Chois.)	16.31	
14	Buck Yam, *Dioscorea triphylla*, Linn.)	16.07	
15	Another Sample	15.63	
16	A third.....	14.83	From a dark colcured variety

ANALYSIS OF A MARKING POWDER FOR LINEN.

During the fair at Frankfort, a powder and brass letters were sold, which latter, dipped into a thin paste made of the above powder and vinegar were to serve for printing on linen. The linen was then to be kept dry for several days, and the marks can then be no longer removeable by lye. The powder is of a red-brown colour, and consists of sulphate and oxide of iron which leaves after the prescribed proceeding, an iron mould on the linen.—*Central Blatt*, No. 12, p. 192.

TRANSACTIONS OF THE BRISTOL CHEMISTS' ASSOCIATION.

On Tuesday, January 11, a lecture was delivered at the rooms of the Association, by R. Owen, Esq., on "Photography," in which the whole process was experimentally explained, and illustrated by many beautiful pictures.

On Tuesday, January 25, a lecture was delivered at the rooms of the Association, by Dr. Brittain, on "Some of the Causes of Sudden Death."

On Tuesday, February 15, and Tuesday, February 29, two lectures were delivered before the Association, by Dr. Staples, on "Poisons," explaining the differences in the *modus operandi* of those substances usually included in the above term, and complaining of the great want of their scientific classification.

On Tuesday, March 14th, a paper was read before the Society by Mr. Bange, on "The Alkaloids." The subject was treated, firstly, Historically, giving a short notice of their respective discoveries. Secondly, Pharmaceutically, describing the various sources from which they were procured, and the different methods of preparing them; and, lastly, were discussed, their chemical formulæ and supposed constitutions.

On Tuesday, March 28, and on Tuesday, May 18, two lectures were delivered before the Society, by Dr. Storer, on "Mesmerism." In the former, Phreno-Mesmerism, and in the latter, Clairvoiance, were more particularly illustrated and explained.

CHEMICAL SOCIETY.

(ANNIVERSARY MEETING.)

March 30th, 1848.—The President in the chair. The report of the Council, with the audited account of the Treasurer was read, and the Society proceeded to ballot for the Officers and Council for the ensuing year, when the following gentlemen were declared duly elected:—

President.—William Thomas Brande.

Vice-Presidents.—John Thomas Cooper, Thomas Graham, H. B. Leeson, M.D., Richard Philips.

Treasurer.—Robert Porret.

Secretaries.—Robert Warington, Edmund Ronalds, Ph. D.

Foreign Secretary.—A. W. Hofmann, Ph. D.

Council.—Thos. Andrews, M.D., Benjamin Brodie, Walter Crum, W. De la Rue, J. J. Griffin, Sir R. Kane, M.D., W. A. Miller, M.D., Lyon Playfair, Ph. D., Edward Schunck, Ph. D., Edward Solly, E. F. Teschemacher, Col. Ph. Yorke.

The thanks of the Society were voted to the President, Officers, and Council for their services during the past year.

April 3d, 1848.—The President in the chair. The following papers were read:—

"*Analysis of Thames Water*," No. 1, by G. F. Clarke. This paper forms the first of a series suggested by Dr. Hofmann to his students at the Royal College of Chemistry, from the fact that although numerous chemical investigations of this water have been made, yet, that no detailed results have ever been published. The water of the present analysis was taken from the middle of the river at Twickenham, two hours after high water, on the 16th December, 1847. The temperature was 49.1° Fahr., and the specific gravity 1.0003. It was found to contain 22.48995 grains of solid matter in the imperial gallon

consisting of carbonate of lime, soluble organic matter, insoluble organic matter, sulphate of soda, chloride of calcium, carbonate of magnesia, sulphate of potash, sulphate of lime, silicic acid, and free carbonic acid.

"*On the Method of detecting Phosphoric Acid and Fluorine, and on the presence of these substances in the rocks and soils of various geological formations,*" by J. C. Nesbitt (first part). After describing the methods of analysis, and the precautions necessary to insure success, the author pointed out that fluoride of calcium might be easily mistaken for phosphate of magnesia. The fluorine should therefore be first separated by sulphuric acid, and the sulphate of lime by means of alcohol, this latter having been driven off by boiling, and tartaric acid and ammonia added in excess; the phosphoric acid is precipitated by an ammoniacal solution of sulphate of magnesia. The author also showed that on boiling fluoride of calcium with hydrochloric acid in a glass vessel, or in presence of silica, that silico-fluoric acid was produced, and the solution would then cause precipitate, not only in salts of baryta, but also in those of potash. In a solution of this kind, it might be easily mistaken for sulphuric acid.

PROPOSED CHARTER OF INCORPORATION.

The Members of the Chemical Society were summoned to a meeting on Monday, the 22d of May, to receive the Report of the Council respecting a Charter of Incorporation, and to consider the expediency of further proceedings regarding it.

The Report of the Council having been read, it appeared to be the general opinion of the Members present, that the arguments in favour of a Charter were conclusive, and a resolution was moved, adopting the Report, and empowering the Council to proceed without delay in the attainment of this desirable object, the expense of which was estimated at not more than £400. The resolution was carried unanimously.

At the close of the meeting, a Member of the Society, while cordially approving of the resolution which had been passed, expressed his regret at the expenditure of so large a sum in obtaining a Charter, which outlay would of necessity diminish the resources of the Society, and thus retard the purchase of books and the completion of the library. He therefore suggested the propriety of opening a subscription for the purpose of defraying the expense of the Charter.

The Secretary observed, that the books now in the possession of the Society, already occupied all the space available for their reception, and that any considerable increase in the collection, would involve the necessity for further expense in providing bookcases and a larger library.

This was an additional and unanswerable argument in favour of the subscription. A sheet of foolscap was handed round, and in the course of five minutes the subscriptions amounted to nearly fifty pounds. It was arranged that a circular should be sent to the Members, in order to give all an opportunity of adding their names to the list. It is confidently believed that the whole of the amount will be speedily raised in this way, for although the number of members is small, their zeal is great.

NOTICES OF BOOKS.

Gray's Supplement to the Pharmacopœia, *being a concise but comprehensive Dispensatory and Manual of Facts and Formulæ for the Chemist and Druggist and Medical Practitioner.* By Theophilus Redwood, Professor of Pharmacy to the Pharmaceutical Society of Great Britain. Second Edition. 8vo, pp. 1070. London : Longman, Highley, Churchill, and Renshaw. 1848.

Our readers being well acquainted with the general character of this work, of which the first edition has been circulated within about twelve months, we need only point out the more important improvements which have been made in the second edition. Although the size of the book is rather diminished than enlarged, much new matter has been added, economy of space having been attained by the use of a more condensed typography and the arrangement of the formulæ in double columns. The history of the foreign Pharmacopœias has been made more complete, and has, with regard to most of them, been brought up to the present time.

Some corrections, founded on recent investigations, have been made in the tables in the early part of the work, especially in relation to specific gravities and atomic weights.

The part of the work treating of animal products is not much altered, but the botanical part is considerably extended.

The most important additions, however, occur in the "Formulæ," which now comprise all the best forms, sanctioned by authority, in different parts of the world, for the preparation and administration of medicines. These are collated from British and Foreign Pharmacopœias, ancient as well as modern, and the name and date of each authority are quoted, so that the dispenser of medicines may ascertain in reference to each formula, whether still recognized or obsolete, and what is the country or district to which it relates.

Many processes are added to those contained in the former edition, so as to adapt the work for reference in the laboratory as well as in the shop. These numerous additions have occasioned a considerable increase in the index, which occupies one hundred and twelve pages. A complete index in a book of reference is of the first importance, as facility in finding any information that may be required, constitutes one of its greatest merits. In this respect, the work before us is a striking example, while the nature and arrangement of its contents are especially adapted to the wants and convenience of the Pharmaceutical Chemist or the Medical Practitioner.

Pharmacy and Technical Chemistry. Edited by S. M. Trier and P. Faber. Copenhagen : Reitzel, Publisher.

This periodical, of which we have received several numbers, contains original Danish, Swedish, and Norwegian articles, by Orsted, Forshammer, Berzelius, Hanoteem, Schorling, and other Scandinavian Chemists and Philosophers, as well as translations from other journals.

On the Cure of Cataract, *with a Practical Summary of the best Modes of Operating (Continental and British).* By Hugh Neil, Surgeon to the Liverpool Eye and Ear Infirmary. 8vo, pp. 224. Liverpool : Deighton and Laughton. London : John Churchill.

The Microscopic Anatomy of the Human Body in Health and Disease. By Arthur Hill Hassall. Part XIII. Samuel Highley, Fleet Street.

Electrical Condition *applied to Facts connected with Heat, Crystalization, Meteorology, &c.* By Franklin Coxworthy.

TO CORRESPONDENTS.

"*Jecoris*" (*Liverpool*).—A Chemist (Manchester) and some other correspondents inquired (too late for our last number), whether the cod liver oil sold by several companies in the north of England, established expressly for the manufacture and sale of that article, can be depended on for medicinal use.—[We have seen some samples of the oil, which appeared to be genuine, and of fair quality. In the manufacture of this article, especially on the large scale, the produce is not all equally fine; it is therefore the best plan to purchase by sample.]

Messrs. Harris and Co., 30, *Steward-street, Bishopsgate*, observing in our last number an admission that we are not acquainted with a method of refining neat's-foot oil, have sent us a sample, informing us that they refine it on a large scale, without using charcoal, acid, or alkali, and that it is extensively used in machinery.—[We are aware that neat's-foot oil can be made sufficiently pure for this purpose by exposure to light and filtration; but the object desired is to deprive it of smell and adapt it for use as a hair oil, and to mix with pomatum—it being considered that an animal oil is better for the hair than vegetable oils. The sample sent is quite bright and apparently pure, with one unfortunate exception, that it has a strong rancid smell. It is this defect for which we have in vain sought for a remedy.]

Poison for Rats and Beetles.—A correspondent inquires how phosphorus can be minutely divided so as to be used as a poison for vermin.—[The process is very simple. Put a drachm of phosphorus in a flask with about two ounces of water; plunge the flask in hot water. As soon as the phosphorus is fluid, pour it into a mortar with two or three ounces of lard. Triturate briskly, adding water and about half a pound of flour, with an ounce or two of brown sugar. Work the whole into a paste, and divide it into balls the size of marbles. The proportions of the ingredients are optional, and for rats, cheese might be better than sugar; for beetles, sugar is more attractive.]

"*Temperance*" inquires whether the constant use of chicory mixed with coffee, or as a substitute for it, is likely to be prejudicial to the health?—[Dr. Pereira states that chicory coffee forms a perfectly wholesome beverage. The medicinal properties of the plant resemble those of dandelion. In excessive doses it might disagree with the stomach, and act as an aperient.]

T. S. C., A.P.S., complains that the nomenclature used by Chemists is perplexing, especially alluding to the new terms applied by Dr. Stenhouse to denote certain proximate principles which he has discovered in the lichens (for instance, Erythric acid, Picro-erythria, &c.). He thinks that those who use terms having a Latin or Greek origin, should explain their derivation for the benefit of those who are not classical scholars.—[The names of objects are arbitrary. They may, by their derivation, denote the source or nature of the article, and sometimes do; but this is not always the case, nor is it necessary. When Adam named the birds of the air and the beasts of the field, he had no classical authority to guide him, yet the names answered every purpose, and we have never heard his authority called in question. The discoverer of any new product or substance is in a similar position. He may give it any name he pleases, provided always that such name is not already in use, with a signification inapplicable to the article in question.] Our correspondent also objects to the use of the term *vinegar* in the plural, as "the vinegars of commerce," which he considers to be an outrage on the English language, observing, that we might as well pluralize the word flesh, gold, silver, in short, almost every noun in the language. [And so we might; there is one flesh of man, another of birds, another of beasts—all these are fleshes. There is one vinegar from wine, another from beer, another from wood, one adulterated, another pure, all these are vinegars of commerce.]

"*Hirudo.*"—When leeches have been sold, it is not usual nor proper to exchange them, if alleged to be indisposed to bite. A customer who had once been thus accommodated, would no longer feel confidence in purchasing leeches at that shop: for he would suppose that if his leeches were taken back, others would also, and he could not be certain of having fresh leeches. If it could be made to appear that the leeches which had been sold were not healthy, it would be better to give other leeches for nothing than to allow the impression to go forth that an unhealthy leech would knowingly be admitted into the house.

"*Spero.*"—(1.) *Blaine's Veterinary Art* relates almost exclusively to horses and cattle. We are not acquainted with any English Work which describes the medical treatment of animals in general.—(2.) We have seen a compound ordered in Veterinary practice under the name of "white oils," something like the following: ℞. The yolks of two eggs; 3 oz. solution of ammonia; 1 oz. oil of origanum; 4 oz. oil of turpentine; a pint of vinegar. Mix. s. a.

"*Amator Scientiæ.*"—(1.) No.—(2.) No.—(3.) Yes.—(4.) The substitution of the one tincture for the other would be improper.—(5.) Mr. Waller's coffee-pot answers very well, when used by those who understand the principle of its construction.—(6.) We cannot adopt the suggestion at present.

"*Quæsitor.*"—Liquor ammoniæ, if immediately applied, will generally restore the colour of black cloth when discharged by an acid.—(2.) *Griffith's Chemistry of Fire, Air, Earth, and Water* is a popular work, designed rather for the use of schools and amateurs than for chemical students.

"*Haustus.*"—The three examinations of the Pharmaceutical Society are described vol. vii., No. 7.

W. T. P. (*Knaresborough*).—See the above answer. Some acquaintance with the Edinburgh and Dublin Pharmacopœias is requisite. This may be obtained from Thomson's or Christison's Dispensatory.

F. M. C. (*Southampton.*)—(1.) We understand that the new edition of Dr. Pereira's *Materia Medica* is progressing; but cannot say how soon it will appear. An edition of Hooper's *Dictionary* was published not long ago. (2.) Christison's is a standard work on Poisons, and was unrivalled until the appearance of Taylor's. They are both excellent works, it would be invidious to give any comparative opinion.—(3.) We cannot recommend any work to assist in "counter practice." Whenever such a work is wanted, the patient should be referred to a medical man. The practice of medicine cannot be learned by reading a book.—(4.) It is generally reported about this season of the year that a new Pharmacopœia is in the press. The rumour is rife at this time; but no date is attached to it.

J. H. (*Guildford*).—(1.) We fear not.—(2.) Ung. Hyd. Nit. Oxyd. is liable to change colour by keeping; we can suggest no means of preserving it. It should not be kept long.—(3.) See the answer above (No. 3, in the Pharmacopœia.)

J. S. S. (*York*).—There is no law to prevent grocers from selling drugs.

"*A Subscriber.*"—See Mr. Upton's evidence before the Parliamentary Committee, page 555.

J. B. (*Manchester.*)—A registered Apprentice on joining the Pharmaceutical Society receives the Journal gratis, as well as the other privileges, among which is a claim on the Benevolent Fund in case of unforeseen misfortune, subject to the regulations. The subscription for the above is 10*s.* 6*d.* The *Pharmaceutical Journal* may be had through any bookseller for 12*s.* a year, being 1*s.* 6*d.* more than the subscription of Associates and Apprentices.

A. P. S. (*Croydon*).—The formula for *Ferri acetas* of the Dublin Pharmacopœia is—

℞ Carbonate of iron..... 1 part
Acetic acid ..... 6 parts.

Digest for three days and filter.

The carbonate of iron of the Dublin is the same as the sesquioxide of iron of the London Pharmacopœia, and the acetic acid of the Dublin Pharmacopœia is about double the strength of that of the London Pharmacopœia.

"*An Associate.*"—The process of displacement should be adopted for separating the infusion, and if this is not strong enough, it may be concentrated by evaporation.

"*Index.*"—The following is Kerr's process for making the *Solution of Persesquinitrate of iron* :—

℞ Iron filings, or wire..... ℥iss.
Nitric acid .... f ℥iij.
Hydrochloric acid ..... ℥j.
Water ..... f ℥xxvij.

Put the iron into a Wedgwood's dish, and pour over it the nitric acid diluted with ℥xv of the water ; let them stand until chemical action has ceased, then decant the liquid from the remaining iron, and add to it the hydrochloric acid and as much water as will make ℥xxx of the solution.

J. H. (*Thirsk*)—In making gun-cotton, most of the acid is absorbed. That which is saved by pressing the cotton may be used again for the same purpose. If gun-cotton, when exploded, leaves a residuum of carbon, it is not properly prepared.

O. R. has sent us some comments on the rules for the distribution of the Benevolent Fund, which we should have published if it had not been anonymous. He objects to the seventh rule, which provides that "no person possessing thirty pounds per annum shall be eligible to this fund," observing that thirty or even fifty pounds per annum would barely provide the common necessaries of life, and that cases might occur in which men of education and experience, although possessing more than that income, might nevertheless be very deserving objects for relief.—[Our correspondent will perceive, on reference to the regulations, that this limit relates only to the pension list, or annual relief, and not to casual cases; and that a person receiving casual relief might be eligible from time to time to a repetition, so long as the circumstances continued so urgent as to demand or justify it. We may also observe, that the regulations have been drawn up with a view of making a commencement, and if, in any respect, experience should suggest any improvement, the Council can revise or remodel the regulations according to circumstances, and will, in this as well as in other matters, be glad to attend to the wishes of the Members at large.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers are desired in the ensuing number).

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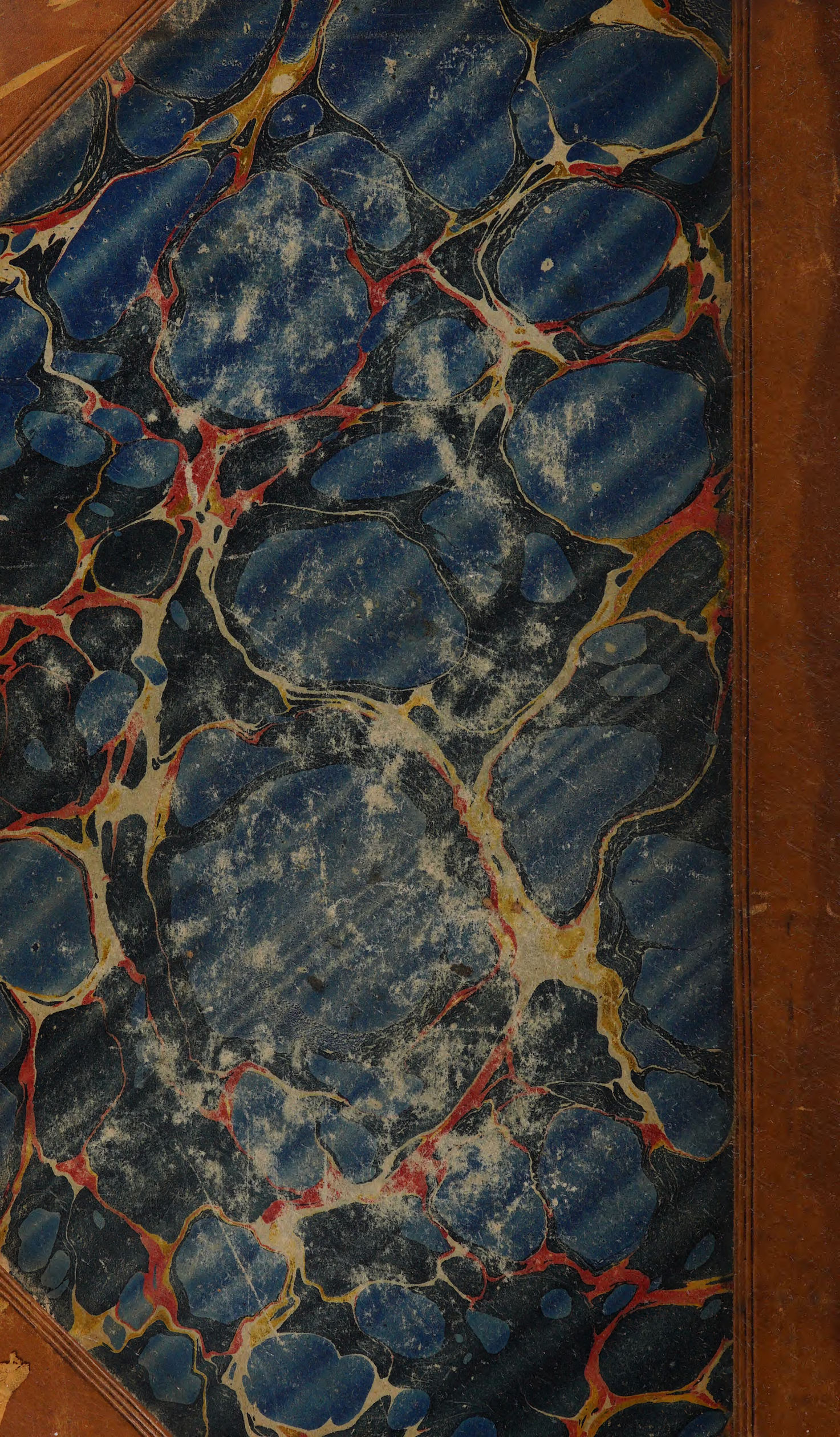
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